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(54) **METHOD OF ADJUSTING LOCATION AND TILTING OF MONITOR**

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(58) **Field of Classification Search**
CPC G06F 1/1601; G06F 3/012; G06T 7/50; G06T 7/521; G06T 7/11; G06T 7/70;
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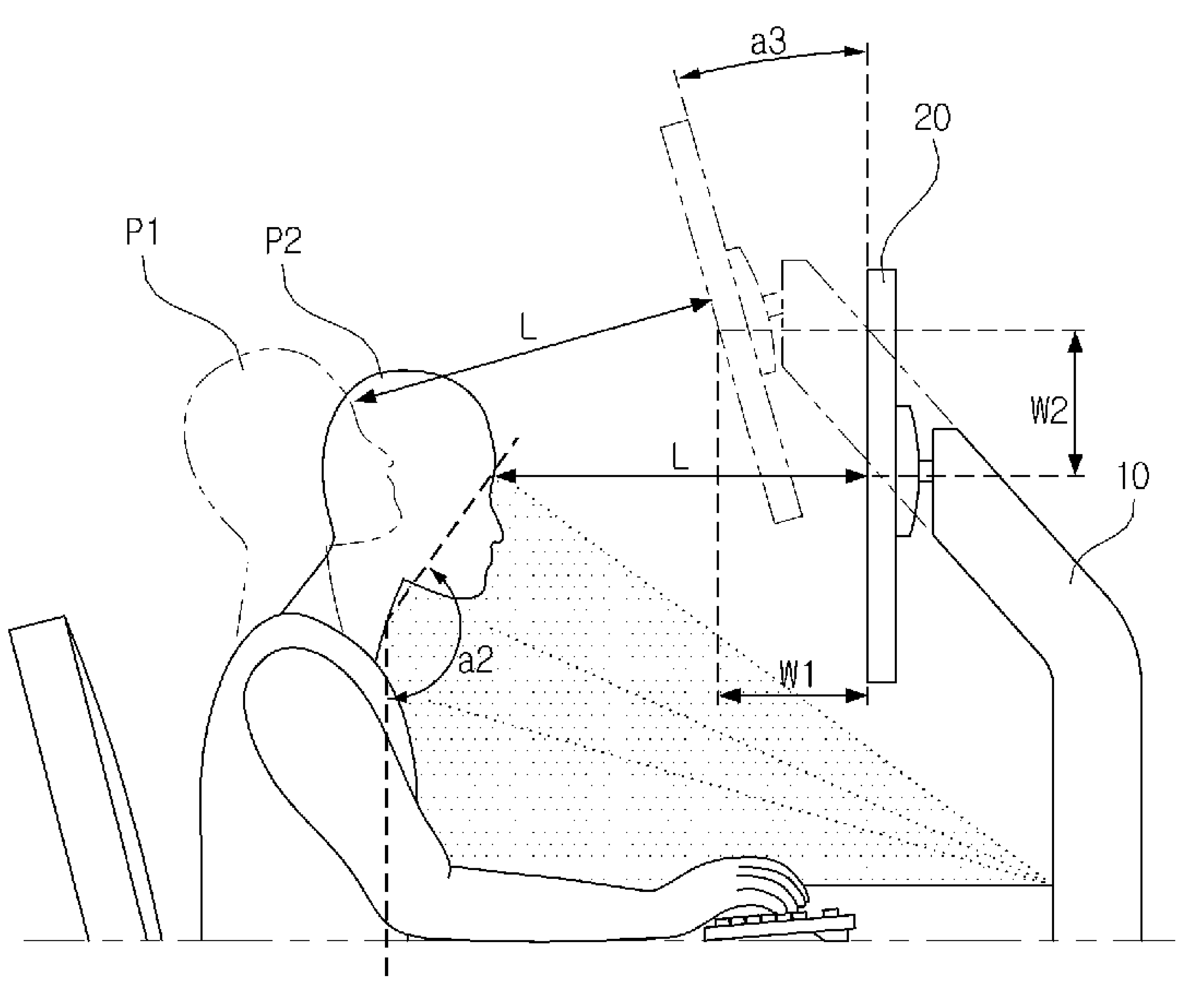
(57) **ABSTRACT**

A display mounting device is disclosed. The display mounting device includes a driving motor which provides a rotational driving force; and an arm unit which receives the rotational driving force and moves linearly in at least one zone, thereby becoming stretched or extended. The display mounting device further includes a display mount for receiving a display and for moving the display in coordination with the stretching or extension of the arm unit.

23 Claims, 17 Drawing Sheets



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F16M 11/10	(2006.01)
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F16M 11/18	(2006.01)
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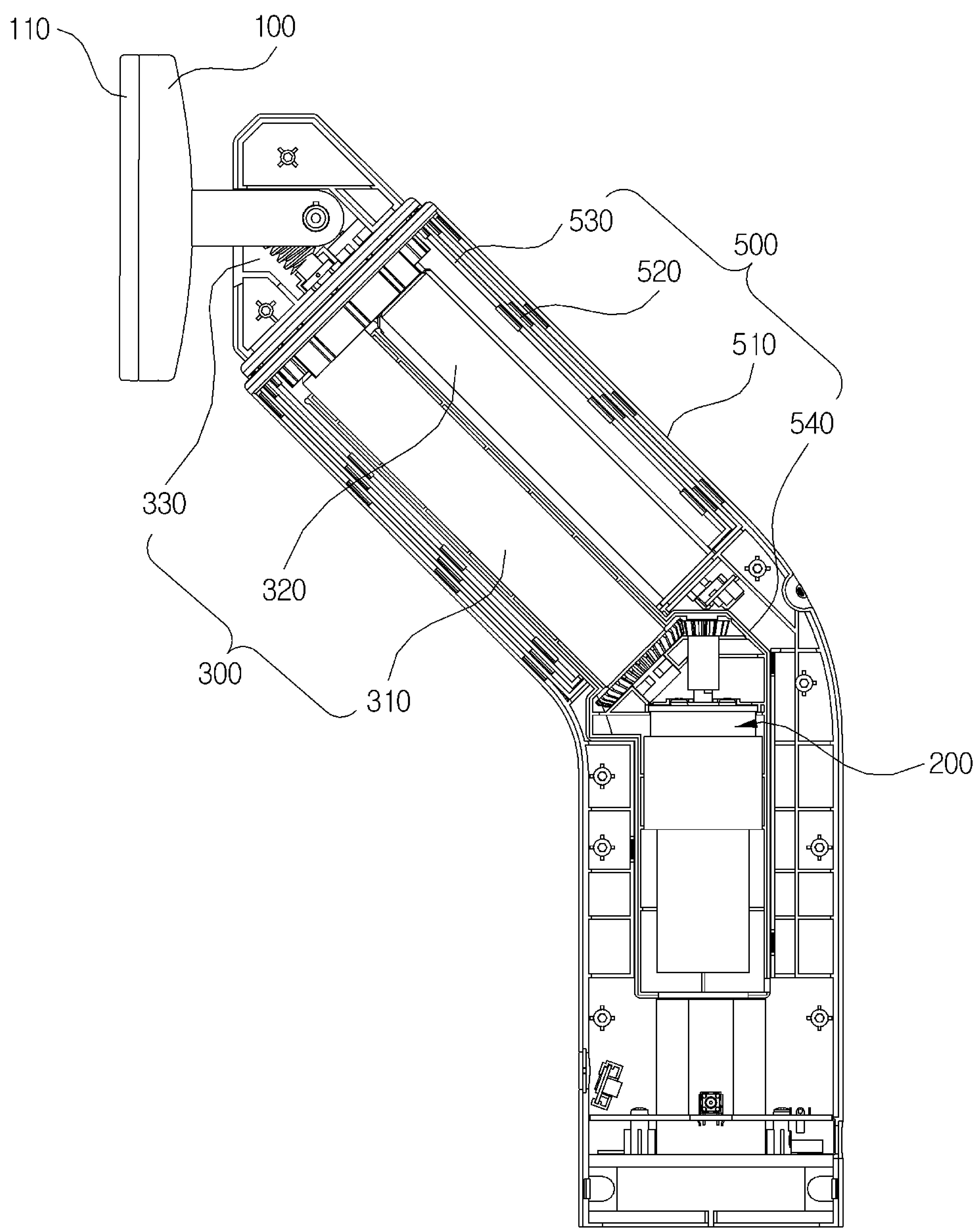
Fig. 1



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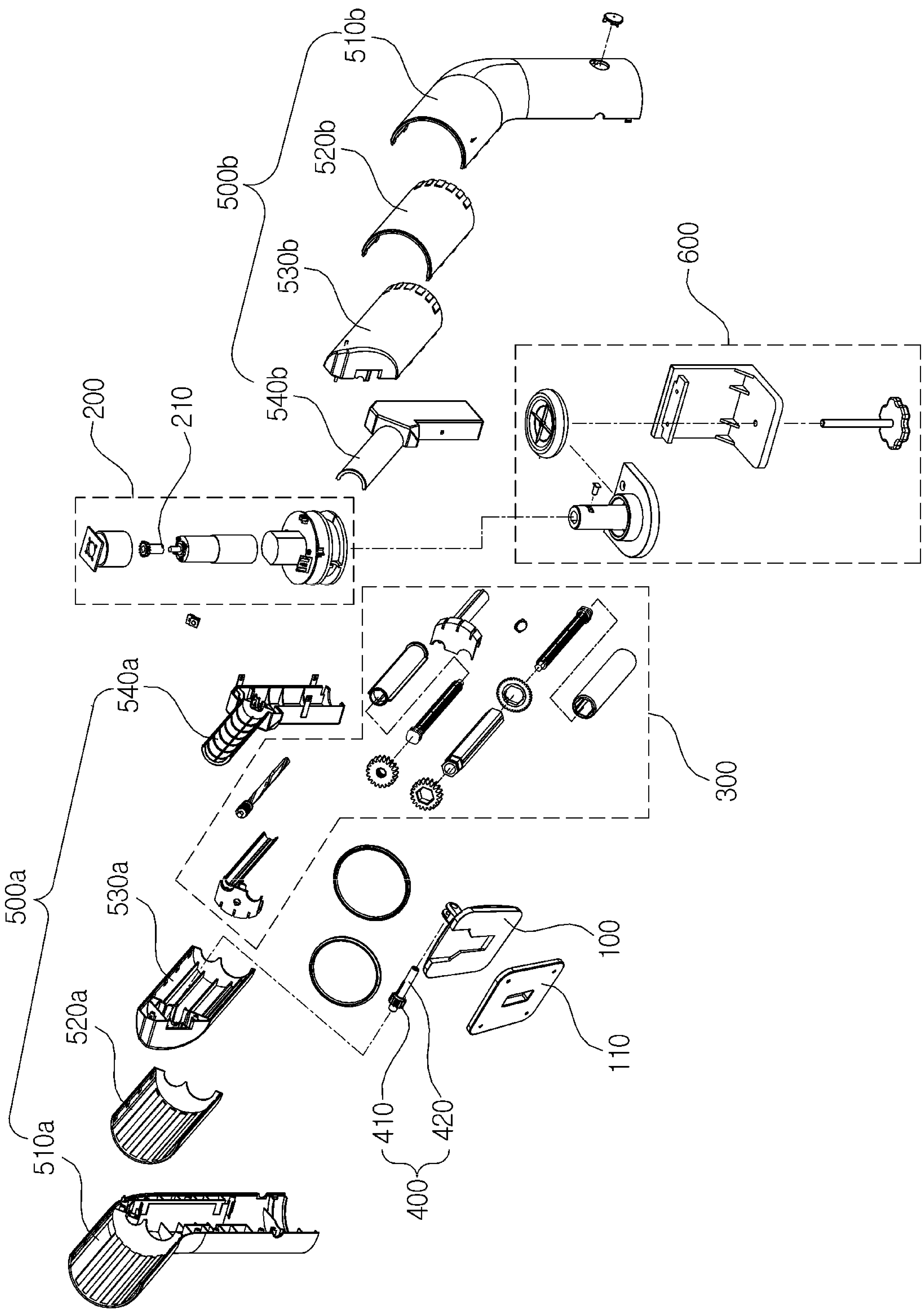
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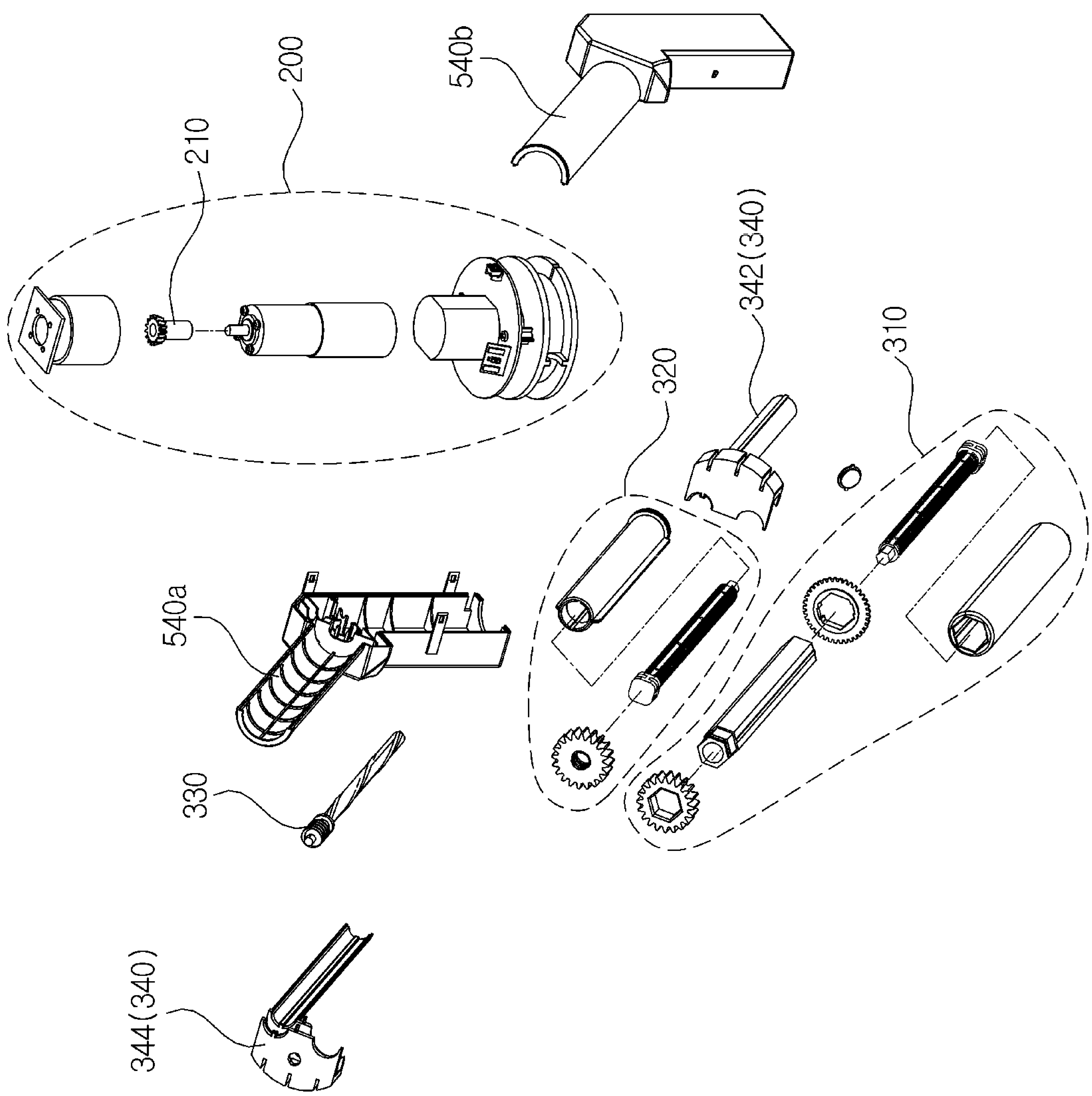
Fig. 3



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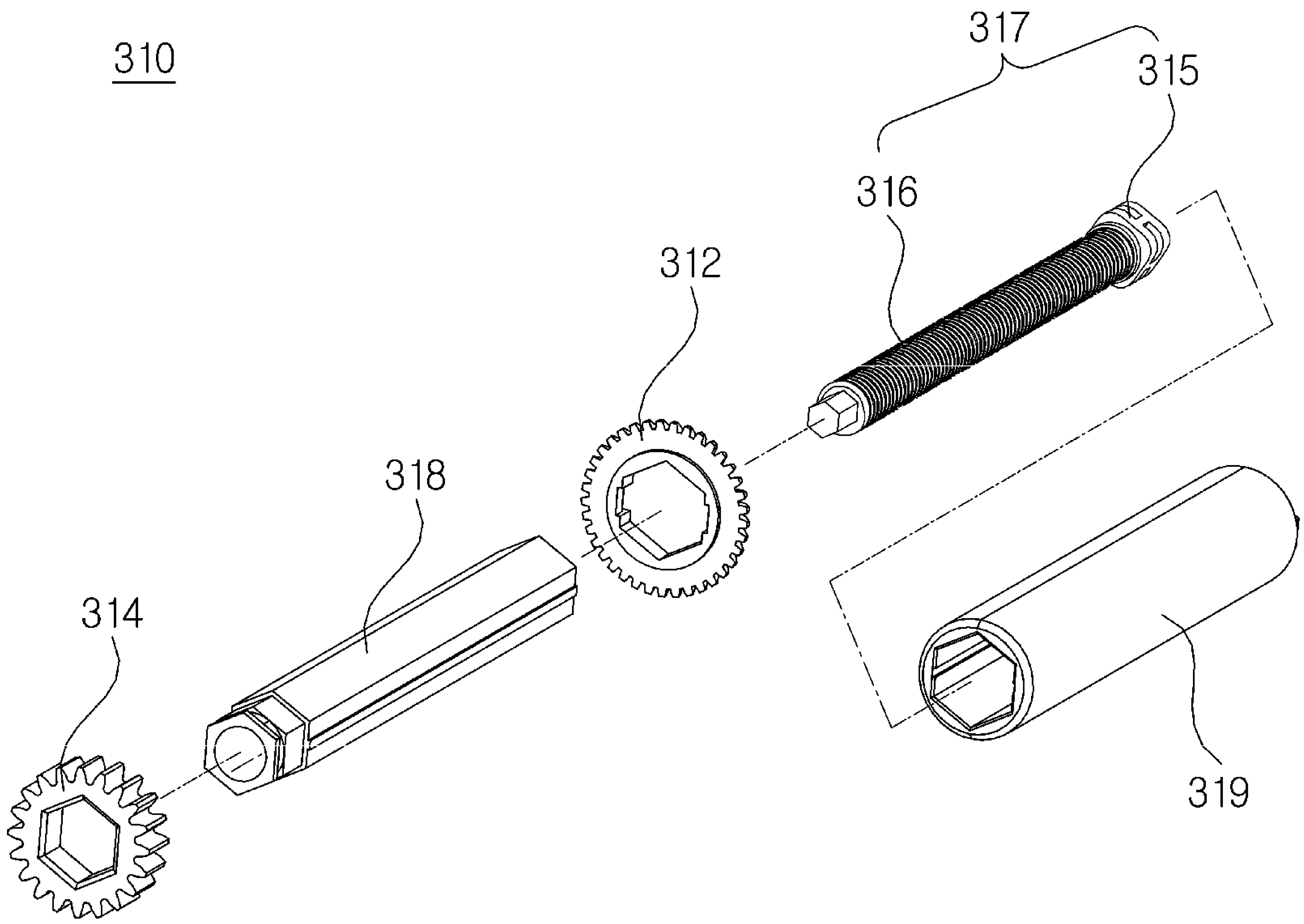


Fig. 5

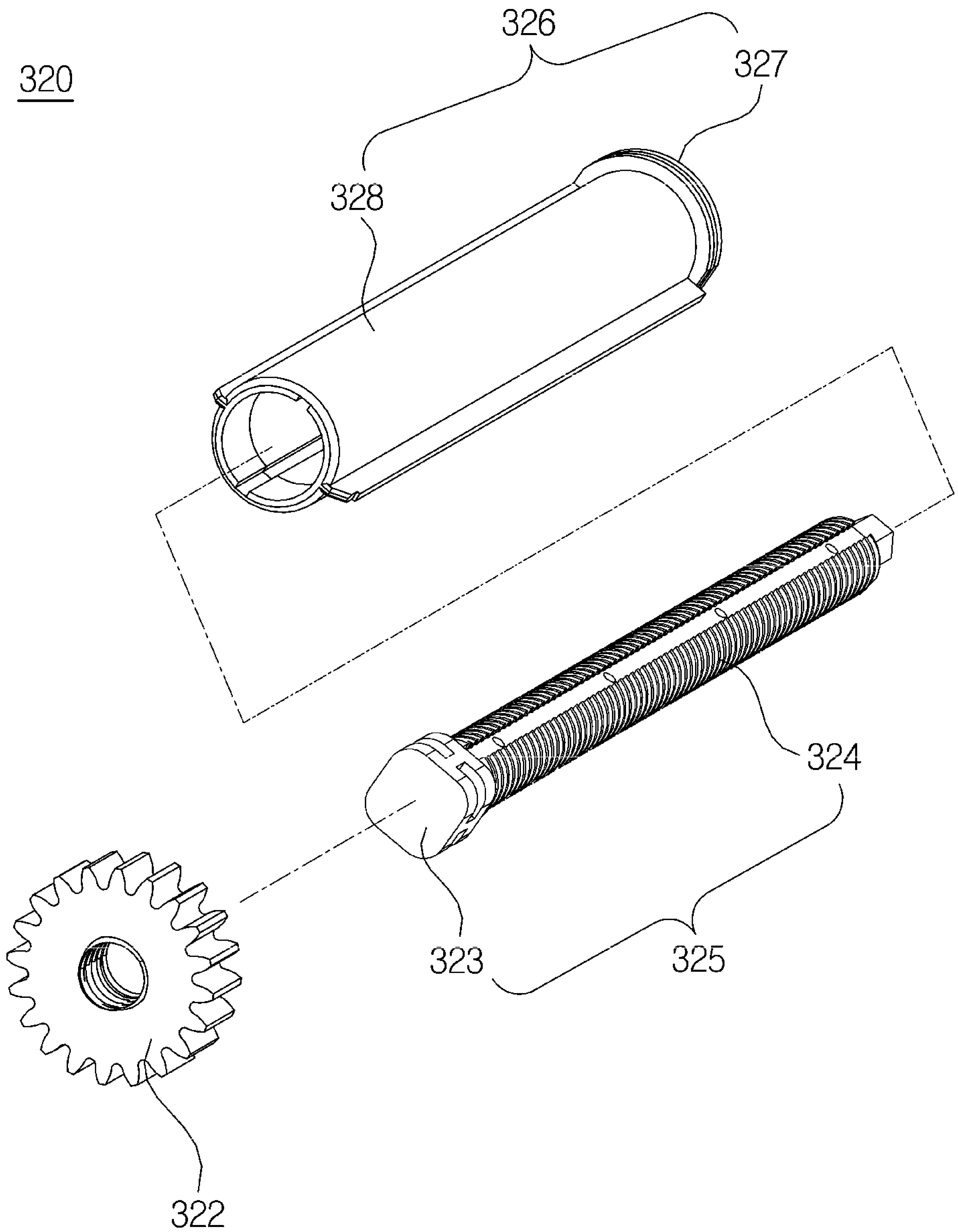


Fig. 6

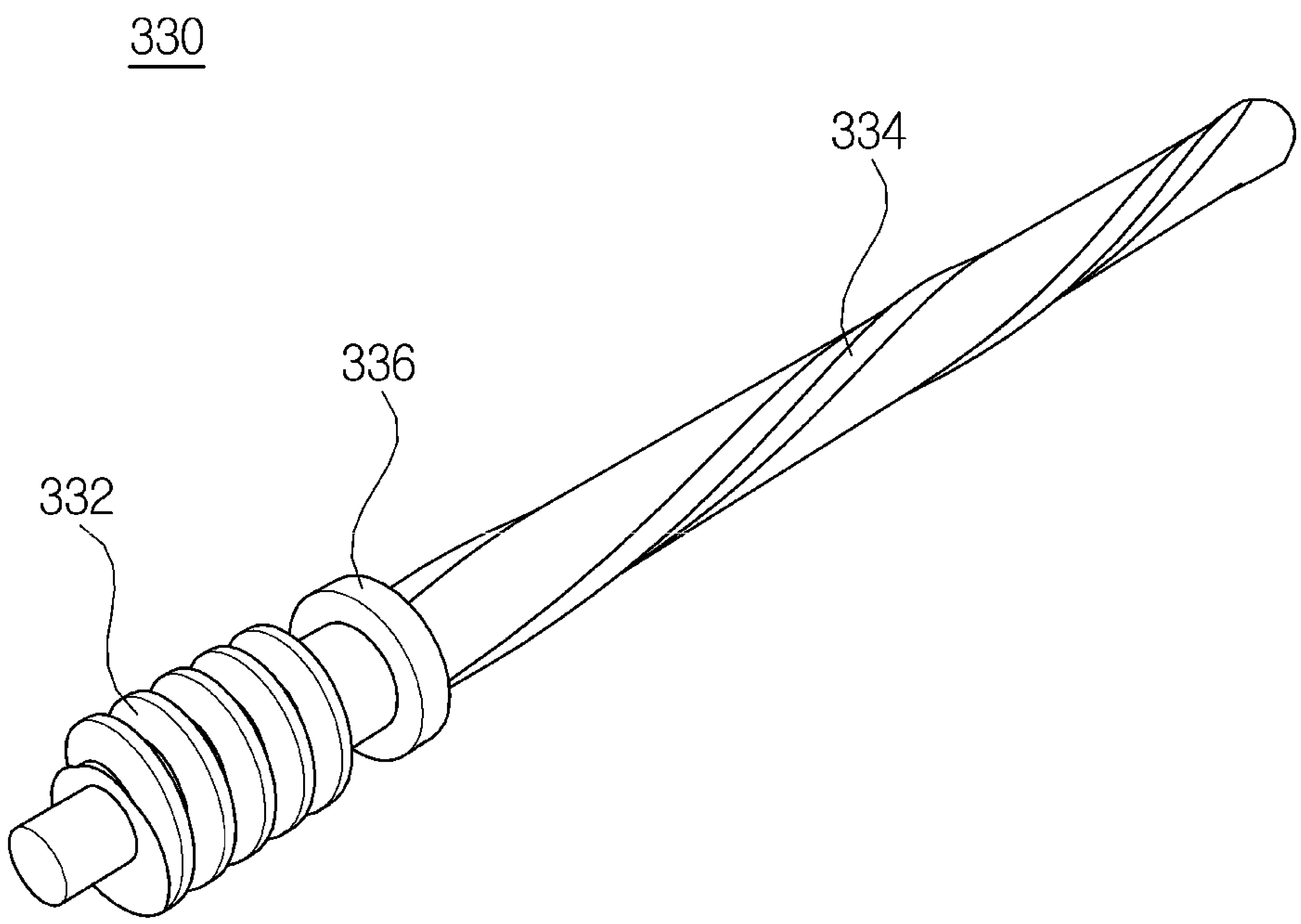


Fig. 7

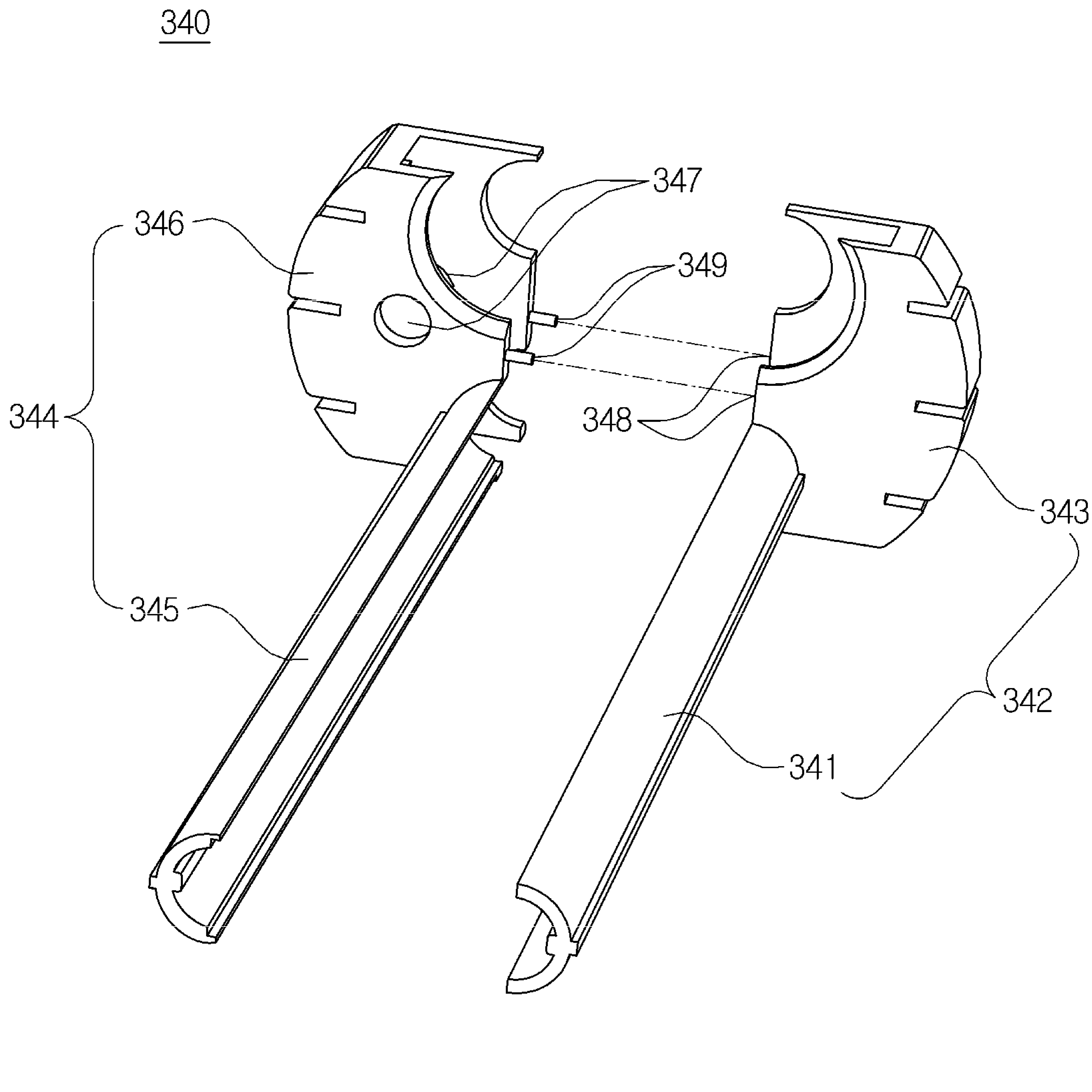
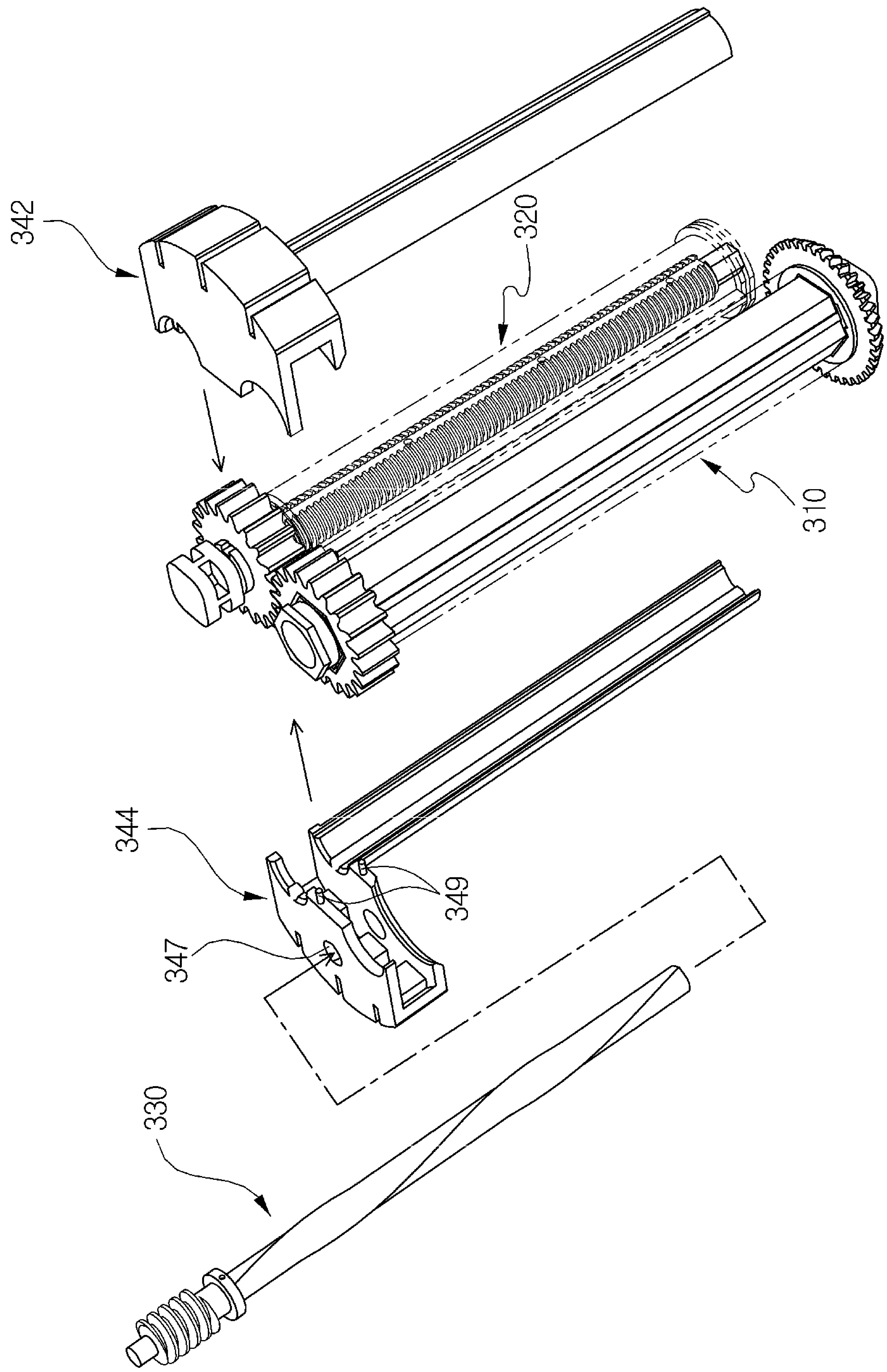


Fig. 8



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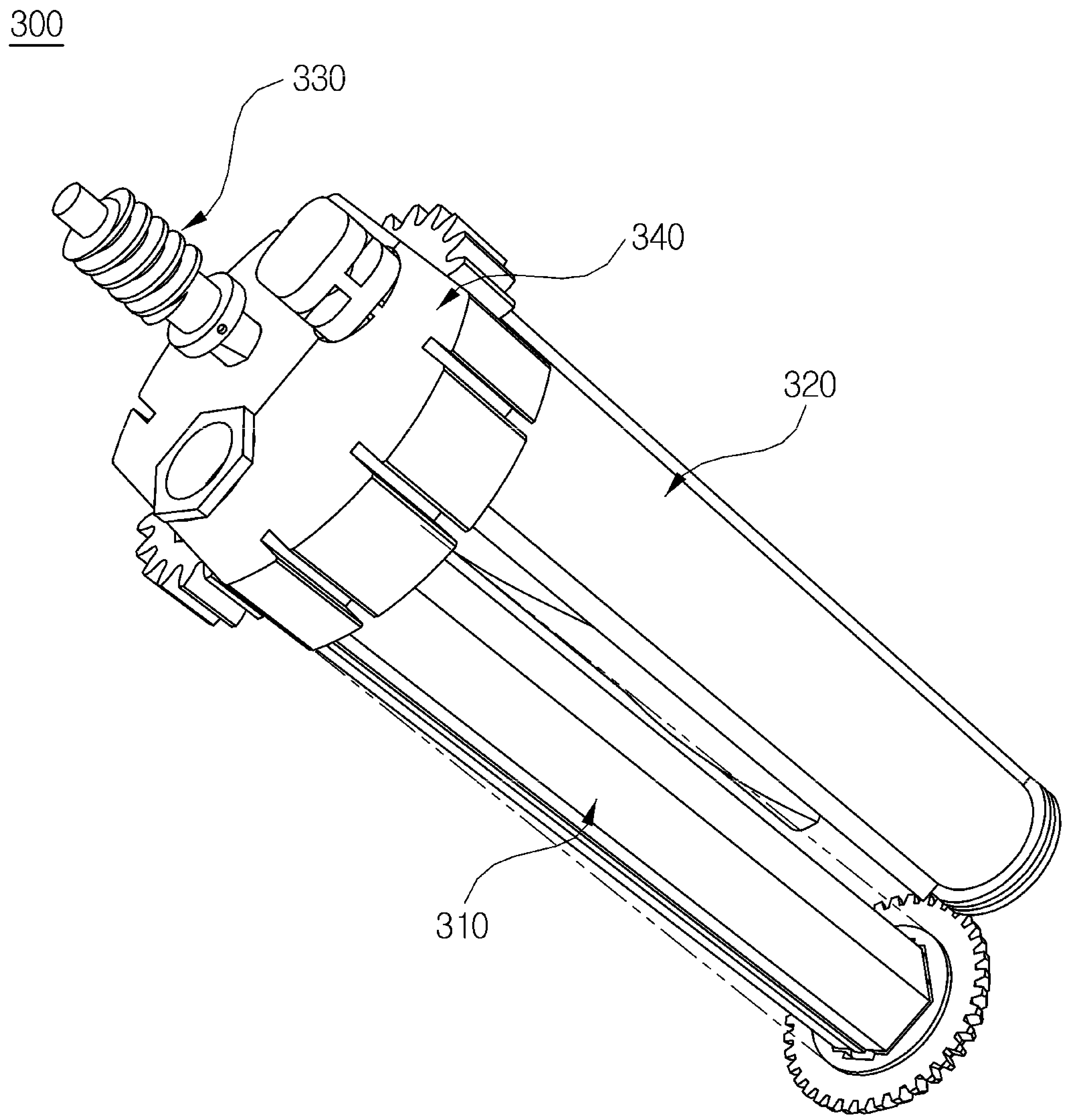

Fig. 10

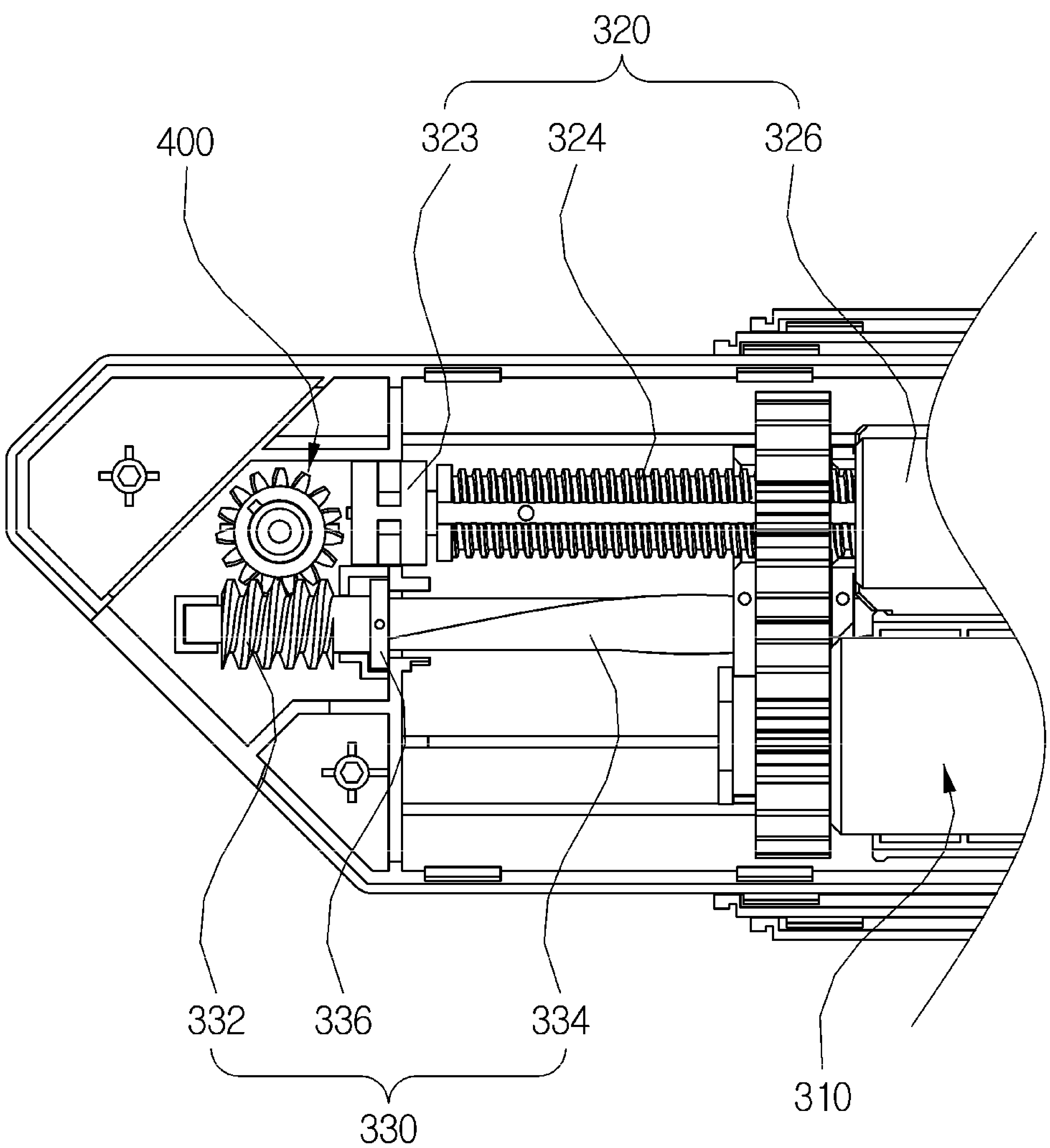

Fig. 11

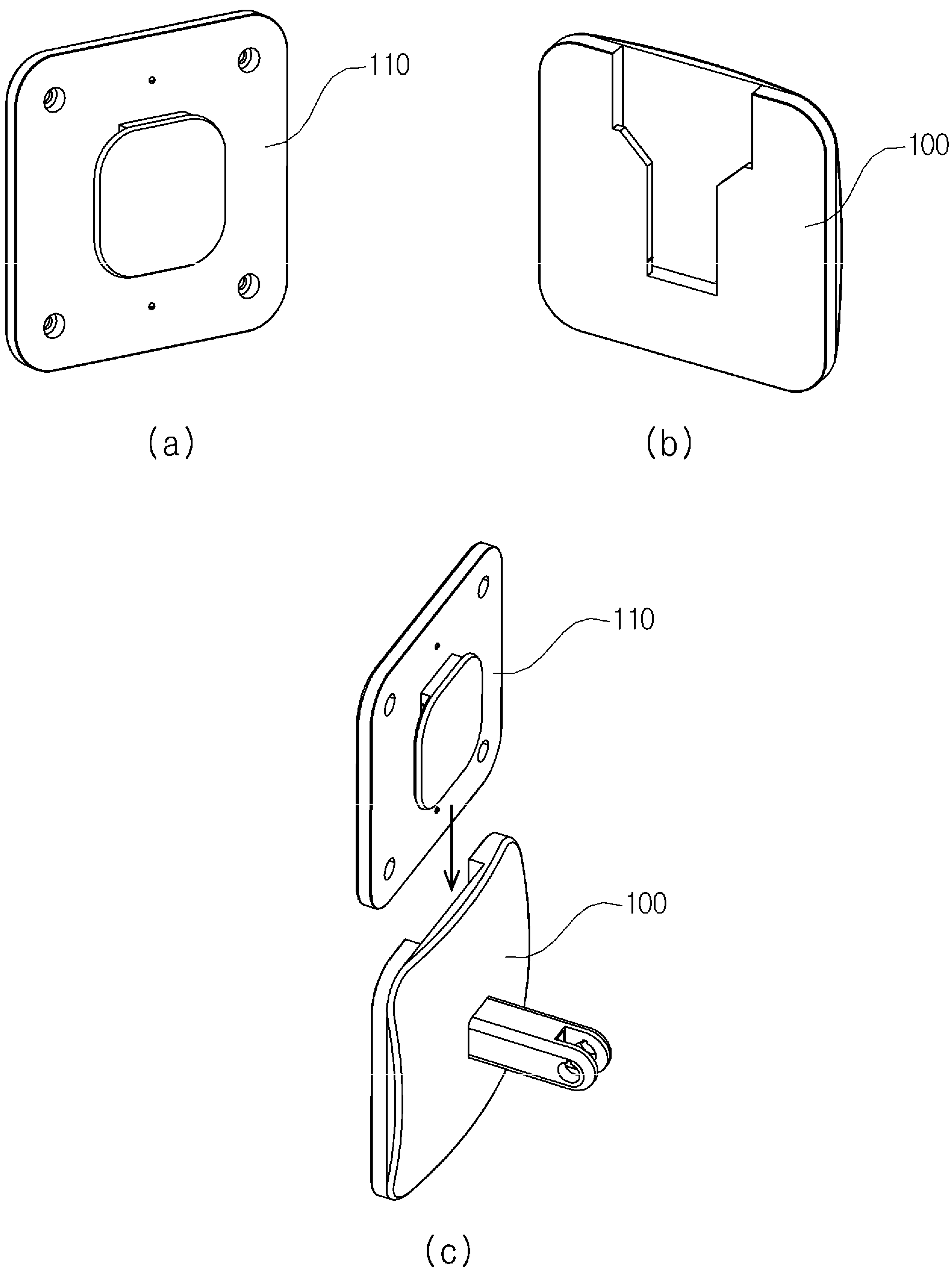

Fig. 12

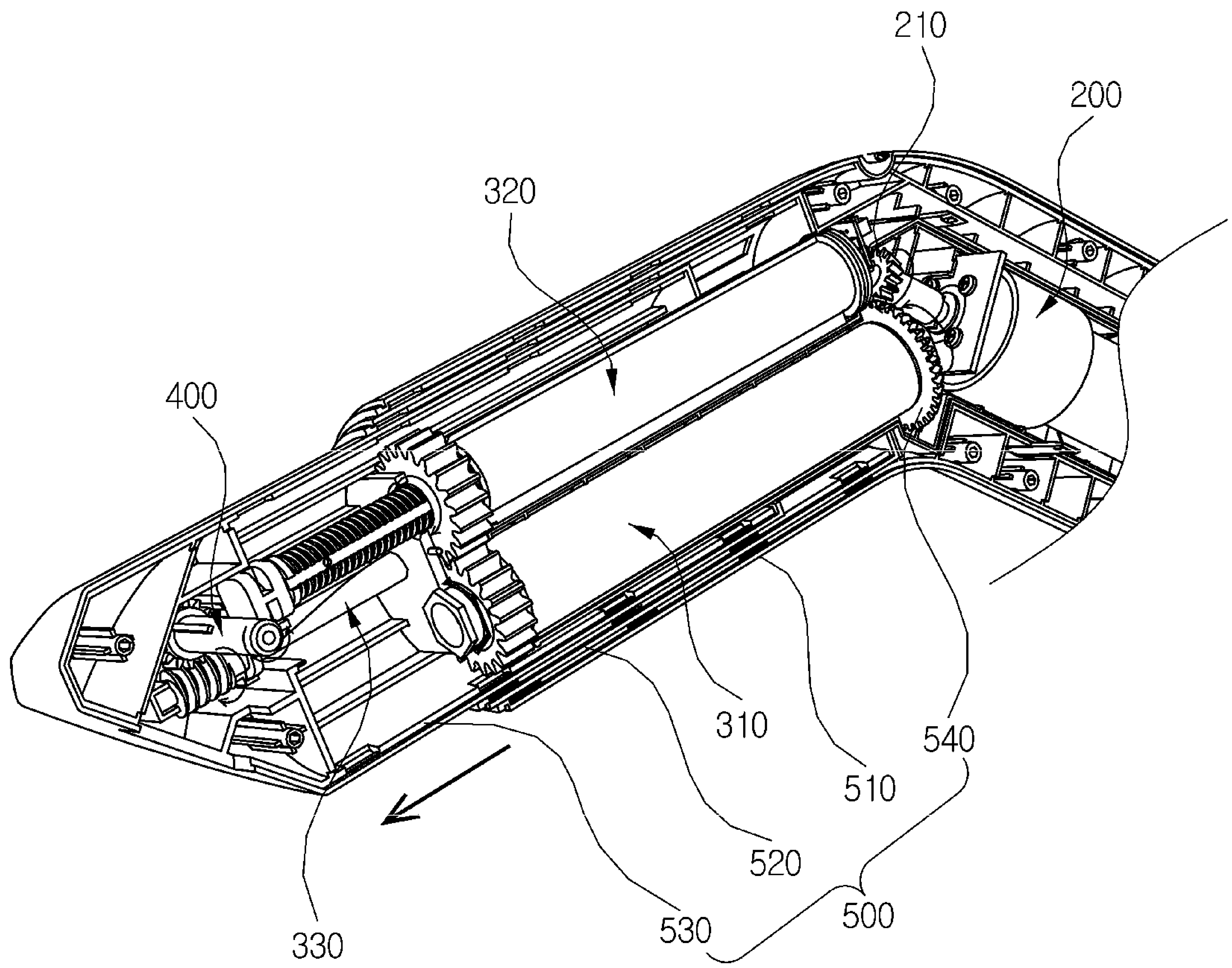

Fig. 13

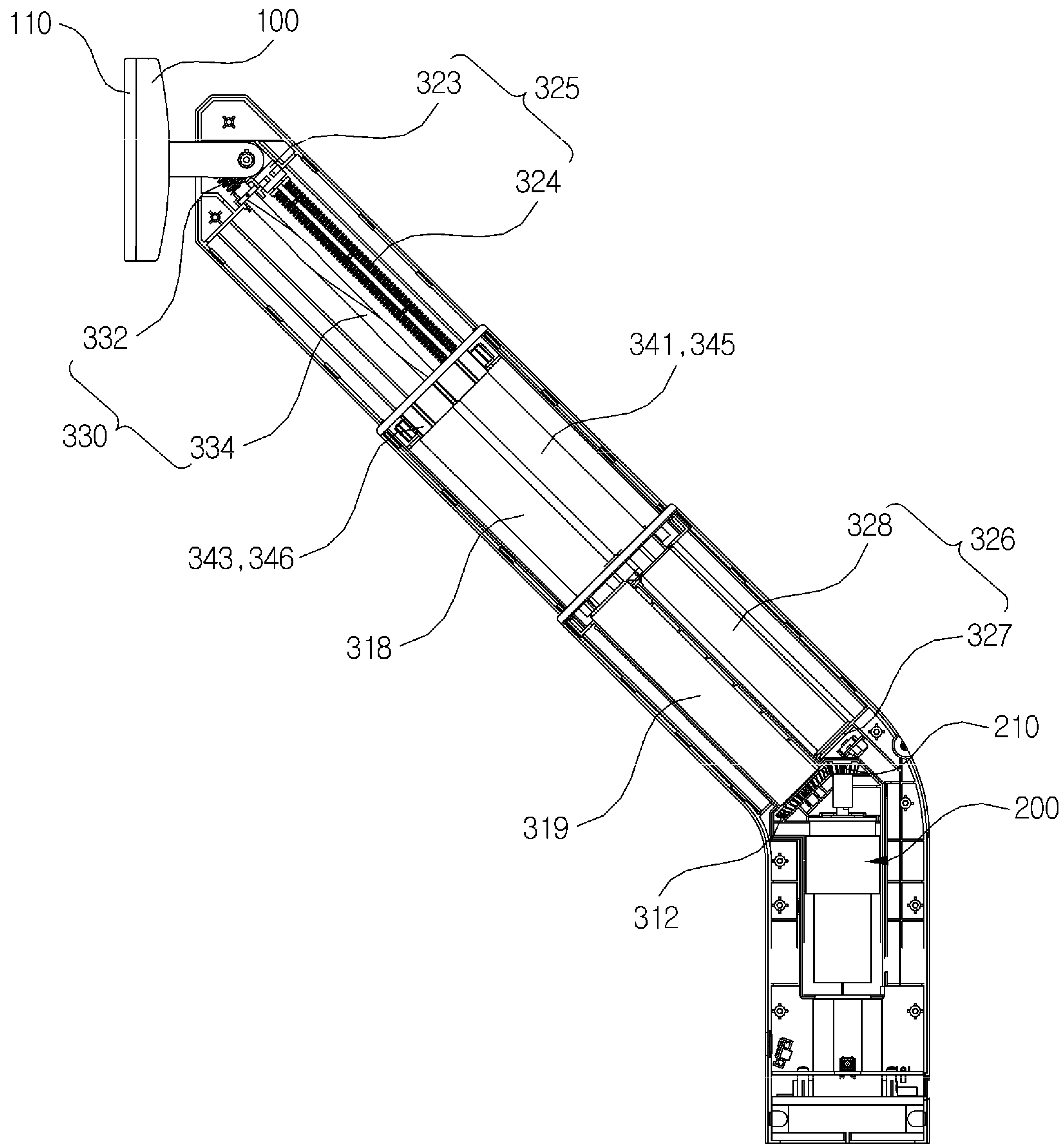
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Fig. 14

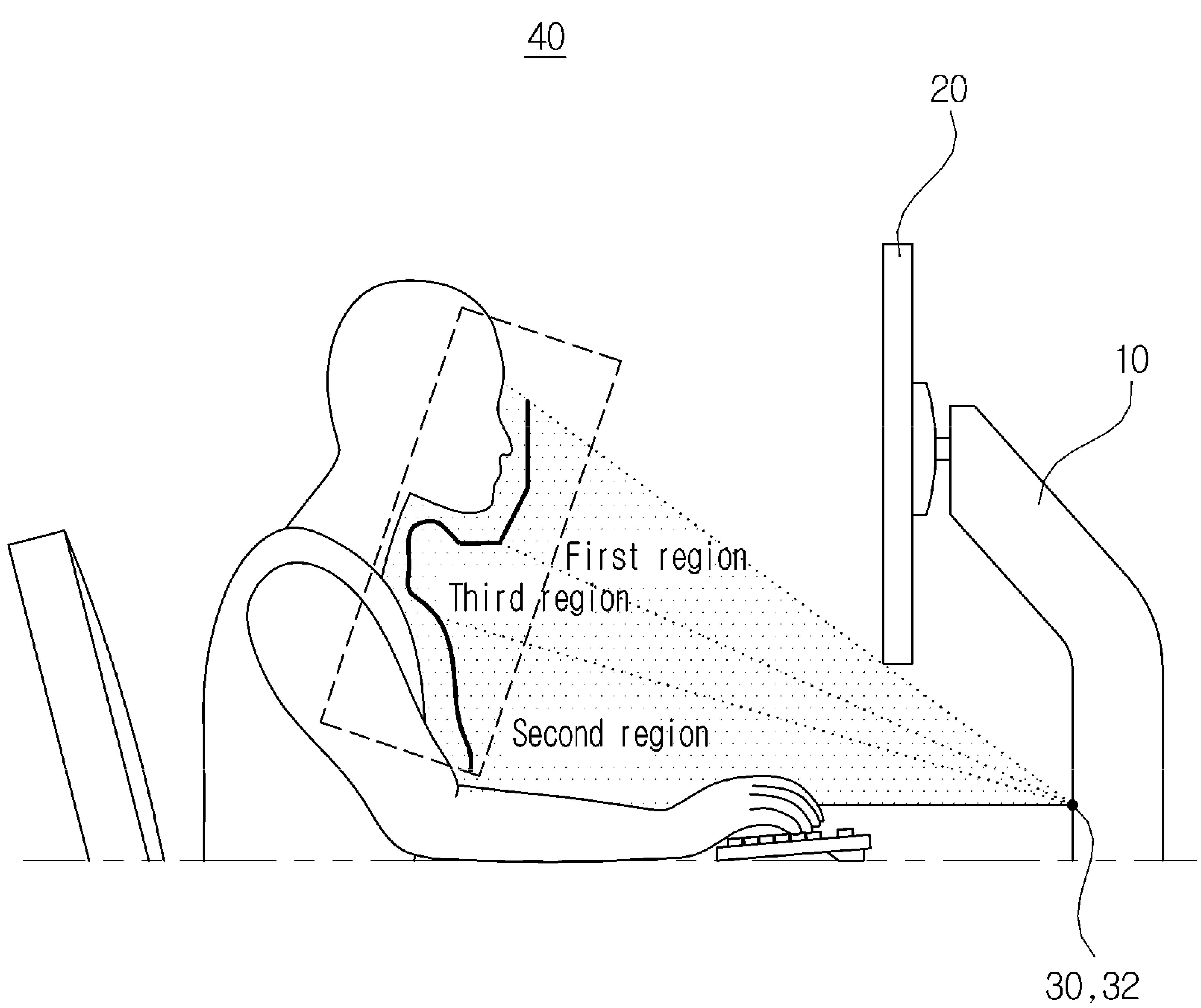


Fig. 15

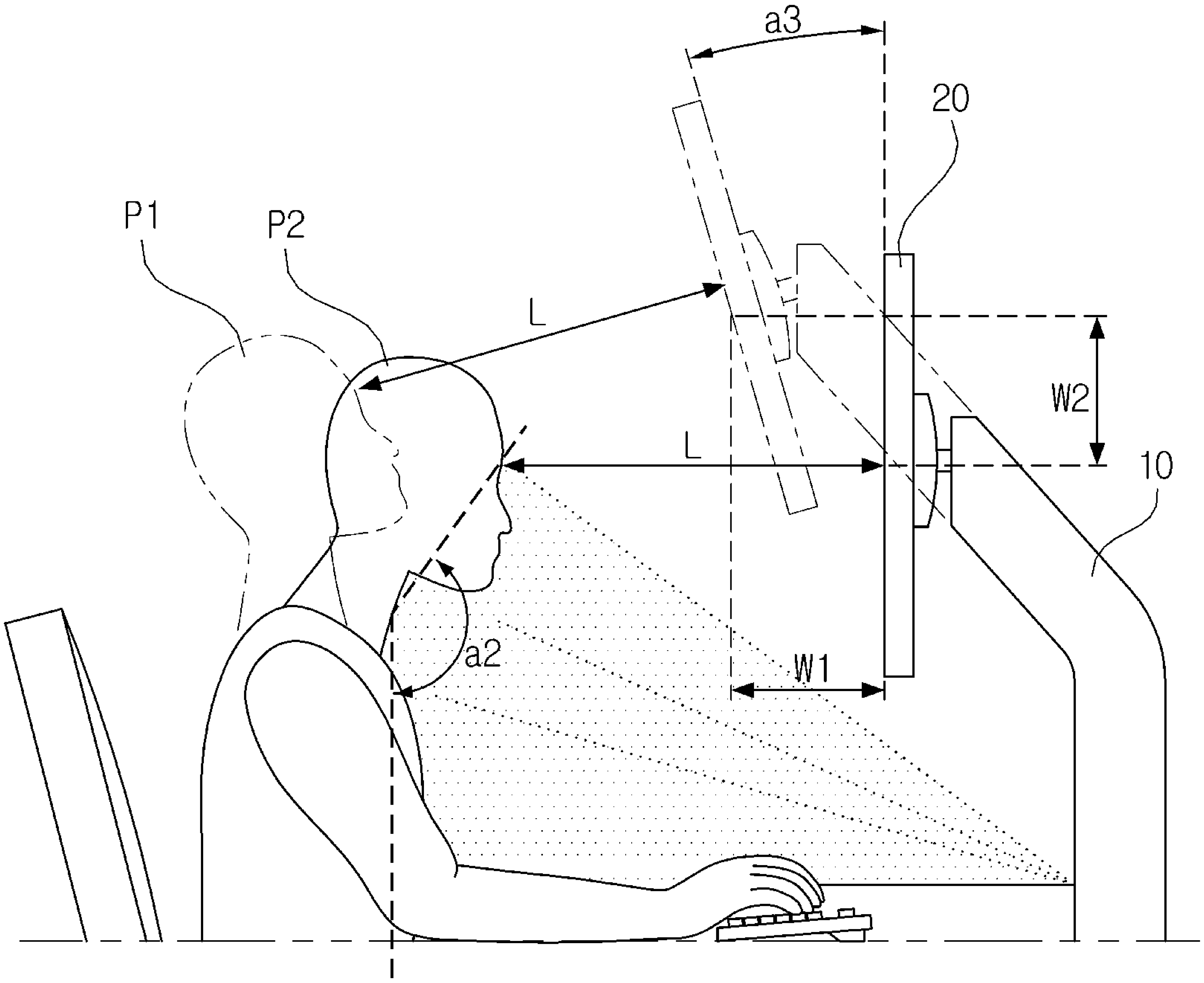
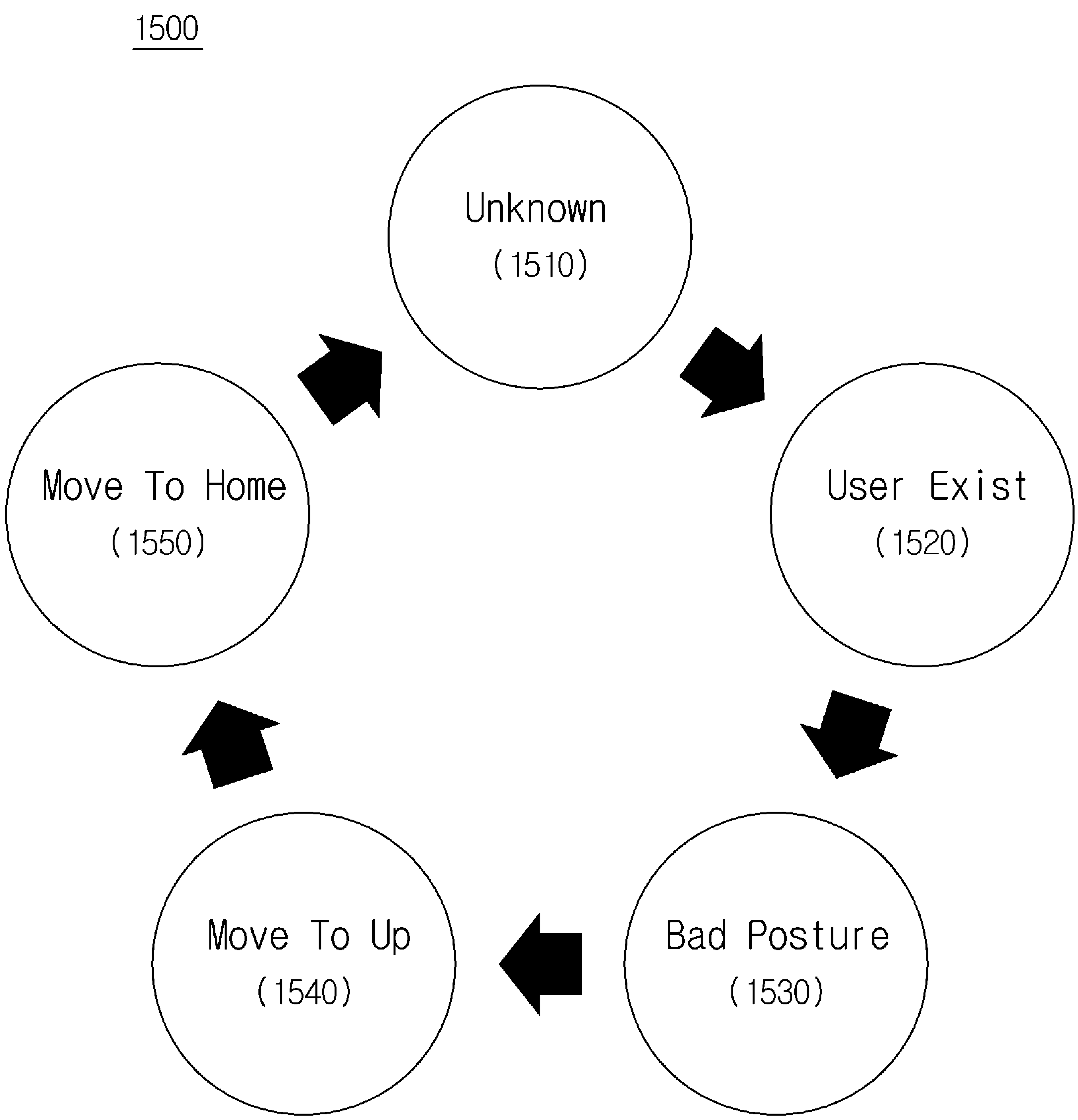


Fig. 16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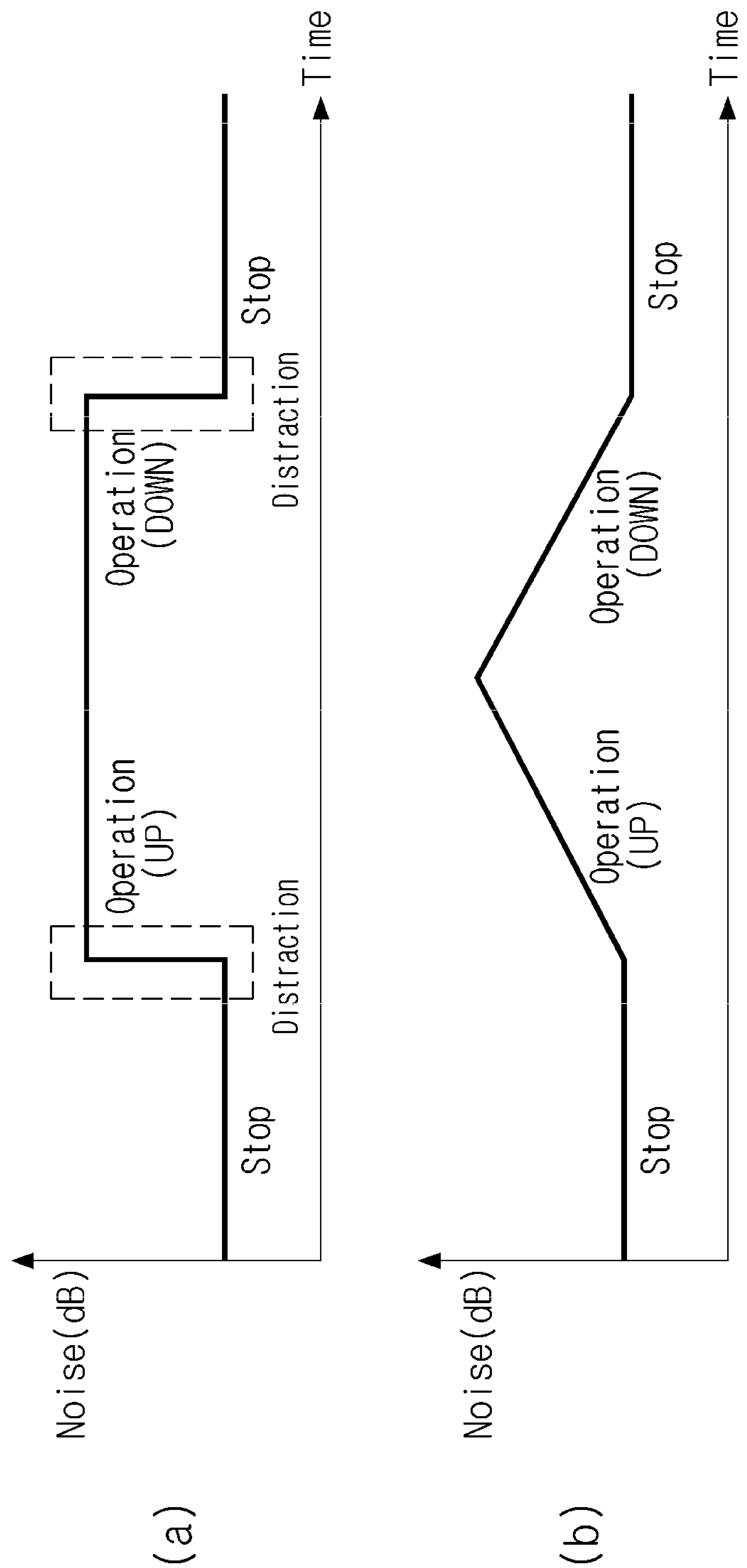
(1520)
Bad Posture
(1530)
Move To Up
(1540)
Move To Home
(1550)

Fig. 17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Noise(dB)
Time
Stop
Distraction
Operation
(UP)
Operation
(DOWN)
Distraction
Stop
(b)
Noise(dB)
Time
Stop
Operation
(UP)
Operation
(DOWN)
Stop

METHOD OF ADJUSTING LOCATION AND TILTING OF MONITOR

BACKGROUND

Technical Field

The present invention relates to a display mounting device for posture correction and a display mounting control system using the same, and more particularly, to a display mounting device for posture correction which moves a position of a display to correct a user's posture and a display mounting control system using the same.

Background Art

The contents described in this section merely provide background information on the present exemplary embodiment but do not constitute the related art.

Recently, as the use of mobile devices such as smart phones and tables has increased and TVs and monitors employing a flat panel display (FPD) have been widely distributed, the mobile devices or displays such as a FPD are being used in daily life.

SUMMARY

Users maintain an undesirable posture while using mobile devices for a long time and perform the work with a monitor which is installed on a desk so that the users perform the work with an undesirable posture for a long time. When the user lives in the wrong posture for a long time, problems such as discs may occur in the cervical vertebrae in the neck. Further, a disease such as a text neck syndrome that the cervical vertebrae in the neck does not maintain the normal shape, but is deformed in an abnormal shape may occur.

When a task is performed using a monitor, the position of the monitor is fixed so that if the user concentrates on the task, it is not easy to perform the task with an ideal posture. Further, it is not easy to consistently visit the hospital or exercise during the busy daily life. Even though a correction tool is used, it is only a one-time thing so that there is a limit to solving the fundamental problem.

Further, even though a position where the monitor or the TV is mounted is changed by a monitor or a TV stand, the monitor or the TV is fixed to one position so that it cannot fundamentally prevent an unconscious abnormal change of the posture of the user during the use.

Therefore, when the mobile devices are used for a long time, the imbalance of the posture is caused, so that a normal curve of the cervical vertebrae is lost, and a load which is three to four times higher than usual is transmitted to the neck, which cause the nerve damage, and head, neck, waist, and shoulder pains to cause poor concentration and chronic fatigue.

Technical Problem

Exemplary embodiments of the present invention have been contrived to solve the above-described problems and a main object of the present invention is to train a posture of the user using a display mounting device while using a mobile device to relieve the chronic fatigue and pains of the head, the neck, the shoulder, and the waist, and improve the concentration and the task efficiency.

Other and further objects of the present invention which are not specifically described can be further considered within the scope easily deduced from the following detailed description and the effect.

Technical Solution

According to an aspect of the present embodiment, the present invention provides a display mounting device, including: a driving motor which receives driving power and provides a rotational driving force; an arm unit which receives the rotational driving force and moves linearly in at least one zone, thereby becoming stretched or extended; and a display mount to which a display is fixed in order to mount the same and which moves the display in coordination with the stretching or extension of the arm unit.

According to another exemplary embodiment of the present invention, the present invention provides a display mounting control device, including: a position detecting unit which detects a position of a user who uses the display with respect to the display; a display mounting device which fixes the display, is provided to be stretched or extended by performing a linear motion in at least one zone by a rotational driving force generated by a driving motor, and moves the display; and a control unit which determines a posture of the user on the basis of the position of the user detected by the position detecting unit and controls the display mounting device to correct a posture of the user.

Advantageous Effects

As described above, according to the exemplary embodiment of the present invention, the present invention may prevent secondary disk metastasis to the neck and the waist by changing a position of the display to maintain an optimal state and correct the posture of the user without user's awareness using the user's unconscious following effect.

Further, according to the exemplary embodiments of the present invention, since the posture training is performed while using the display, the present invention may relieve the chronic fatigue and pains of the head, the neck, the shoulder, and the waist and improve the concentration and the task efficiency.

Even if the effects are not explicitly mentioned here, the effects described in the following specification which are expected by the technical features of the present disclosure and their potential effects are handled as described in the specification of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a view illustrating a display mounting device for posture correction according to an exemplary embodiment of the present invention.

FIGS. **2** to **7** are views specifically illustrating components of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

FIGS. **8** and **9** are views illustrating coupling between components of an arm unit of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

FIG. **10** is a view illustrating an arm unit and a tilting unit of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

FIG. **11** includes diagrams showing a display mount and a mounting jig of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

FIGS. **12** and **13** are views specifically illustrating stretching and extension of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

FIGS. **14** and **15** are views illustrating a display mounting control system using a display mounting device for posture correction according to an exemplary embodiment of the present invention.

FIG. **16** is a view illustrating a state diagram of a display mounting control system of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

FIG. **17** includes diagrams showing a noise according to an operating time of a display mounting device for posture correction.

DETAILED DESCRIPTION

Hereinafter, embodiments of the present invention will be described in detail with reference to the accompanying drawings. Advantages and characteristics of the present invention and a method of achieving the advantages and characteristics will be clear by referring to exemplary embodiments described below in detail together with the accompanying drawings. However, the present disclosure is not limited to the following exemplary embodiments but may be implemented in various different forms. The exemplary embodiments are provided only to complete disclosure of the present disclosure and to fully provide a person having ordinary skill in the art to which the present disclosure pertains with the category of the invention, and the present disclosure will be defined by the appended claims. Like reference numerals indicate like elements throughout the specification.

Unless otherwise defined, all terms (including technical and scientific terms) used in the present specification may be used as the meaning which may be commonly understood by the person with ordinary skill in the art, to which the present invention belongs. It will be further understood that terms defined in commonly used dictionaries should not be interpreted in an idealized or excessive sense unless expressly and specifically defined.

Terms used in the present application are just used to describe a specific exemplary embodiment and do not intend to limit the present invention and a singular expression may include a plural expression as long as it is not apparently contextually different. In the present invention, it should be understood that terminology "include" or "have" indicates that a feature, a number, a step, an operation, a component, a part or the combination thoseof described in the specification is present, but do not exclude a possibility of presence or addition of one or more other features, numbers, steps, operations, components, parts or combinations, in advance.

Terms including an ordinary number, such as first and second, are used for describing various constituent elements, but the constituent elements are not limited by the terms. The above terms are used only to discriminate one component from the other component. For example, without departing from the scope of the present invention, a first component may be referred to as a second component, and similarly, a second component may be referred to as a first component. A term of and/or includes combination of a plurality of related elements or any one of the plurality of related elements.

The present invention relates to a display mounting device for posture correction and a display mounting control system using the same.

The display mounting device **10** for posture correction is a display mounting device which mounts a display such as a monitor used by a user for the task and corrects a posture of the user using a characteristic of the user who follows the display in a viewing angle without awareness and improves a disease which has been already generated and corrects the posture of the user using the same.

The display mounting device **10** for posture correction is created by adding a single motor to the display mounting device of the related art which mounts the display in a fixed position or does not have a driving force to move the display so that the user manually moves the display, to be driven at an angle of the display as well as the horizontal movement and the vertical movement and to be stably and accurately driven using the arm unit and the tilting unit.

The display mounting device **10** for posture correction is ergonomically designed to be installed in consideration of the distance between the display and the user and the display and the desk and also reflects a physical condition of each user.

The display mounting device **10** for posture correction may operate by a telescopic linear motion to diagonally lift the display by means of the arm unit and recognize the posture of the user and lift the display in an appropriate range through the recognized data so that the posture training may be performed very slowly at a speed which cannot be noticed by the user at a predetermined cycle. Here, the predetermined cycle is a cycle set by the user and is desirably 10 minutes.

The display mounting device **10** for posture correction maintains the position of the display in an optimal state in accordance with an environment in which the user uses the display, detects the posture of the user, easily varies the position of the display to correct the posture of the user, and corrects the posture of the user without user's awareness using the user's unconscious following effect. Further, the display mounting device **10** for posture correction may provide not only customized display mounting, but also a therapy effect of the disease, using various modes such as a mode for allowing the user to take a normal posture and a mode for relaxing or strengthening muscles around the neck.

The display mounting device **10** for posture correction uses one driving motor not only to vertically and horizontally move the display, but also to adjust a tilting angle of the display. Further, all components for driving the display are accommodated in a cylindrical housing to reduce a volume so that it is easy to install a mounting device and an extension block is additionally used to be optimized in accordance with the environment of the user.

FIG. **1** is a view illustrating a display mounting device for posture correction according to an exemplary embodiment of the present invention.

Referring to FIG. **1**, the display mounting device **10** for posture correction includes a display mount **100**, a driving motor **200**, an arm unit **300**, and a tilting unit **400**. The display mounting device **10** for posture correction may omit some components among various components which are exemplarily illustrated in FIG. **1** or may further include other component.

According to the exemplary embodiment of the present invention, the display mounting device **10** for posture correction may further include a lead guide unit **347** fixed to the arm unit **300** and a lead screw **330** which is connected between the display mount **100** and the lead guide unit **347** and rotates according to a relative positional relationship with the lead guide unit **347** generated as the interval with the lead guide unit **347** changes. The display mount **100** moves as the lead screw **330** rotates. Here, the interval of the lead guide unit **347** indicates an interval formed to rotate the lead screw **300** by an interval of a pitch formed in the lead screw **330**. Further, the relative positional relationship indicates a positional relationship formed as the lead screw **330** moves and rotates along the lead guide unit **347**.

According to the exemplary embodiment of the present invention, the display mounting device **10** for posture correction includes a first link gear **322** which is directly or indirectly connected to a driving gear **210** of the driving motor **200** to receive a rotational driving force and rotates in a direction, a first link shaft **325** which linearly moves the arm unit **300** by the first link gear **322**, the lead screw **330** which provides a rotational driving force to rotate the tilting unit **400** and forms a screw thread along the outside, and a lead guide unit **347** which rotates the lead screw **330** according to the rotational positional relationship as the first link shaft **325** linearly moves. Here, the direct or indirect connection to the driving gear **210** indicates that the first link gear **322** is directly connected to the driving gear **210** or indirectly connected by means of the second link gear **314**.

The display mount **100** may fix the display to mount the display **20**.

The display mount **100** further includes a mounting jig **110** which is fastened to the display **20** and the display mount **100**.

The display mount **100** may move the display **20** in coordination with the stretching and the extension of the arm unit **300**. Here, the "coordination" means that the arm unit **300** and the display mount **100** are connected to each other so that when the arm unit **300** moves, the display mount **100** also moves together.

The display mount **100** is connected to the display **20** by means of the mounting jig **110** and moves to adjust a tilting angle of the display **20** by an operation of stretching or extending the arm unit **300**.

The driving motor **200** receives a driving power to provide a rotational driving force.

The arm unit **300** may be provided to receive the rotational driving force and move linearly in at least one zone to be stretched or extended. Here, in at least one zone, the arm unit **300** linearly moves to a predetermined height and then smoothly moves at the predetermined height or higher and a speed to the predetermined height and a speed at the predetermined height or higher may be different. For example, the speed to the predetermined height may be faster than the speed at the predetermined height or higher, but is not necessarily limited thereto.

The arm unit **300** may increase or decrease in length by the driving motor **200** and may be maintained in an elongated state.

The arm unit **300** includes a second driving assembly **310**, a first driving assembly **320**, and a lead screw **330**.

The second driving assembly **310** is connected to the driving gear **210** of the driving motor **200** to receive the rotational driving force to rotate, be stretched or extended.

The second driving assembly **310** includes a rotary gear **312**, a second link gear **314**, a rotary shaft **318**, a second link shaft **317**, and a second housing **319**.

The rotary gear **312** is connected to the driving gear **210** to receive a rotational driving force to rotate.

The second link gear **314** receives the rotational driving force by the rotary shaft **318** to rotate and is connected to the first driving assembly **320** to transmit the rotational driving force to the first driving assembly **320**.

The rotary shaft **318** is connected and fixed to the second link gear **314** and rotates by the rotary gear **312** to linearly move the arm unit **300**.

The second link shaft **317** is provided in the rotary shaft **318** to move along the screw thread formed in the rotary shaft **318** and stretch or extend the length.

The second housing **319** is connected and fixed to the rotary gear **312** and is assembled to include the rotary shaft **318** therein to rotate the rotary shaft **318** by the rotation of the rotary gear **312**.

In the second driving assembly **310**, the rotary gear **312** receives the rotational driving force to rotate the second housing **319** connected to the rotary gear **312** and the second link gear **314** connected to the rotary shaft **318** rotates along the second link shaft **317** as the rotary shaft **318** assembled by the second housing **319** to be included therein rotates.

In the second driving assembly **310**, the second link gear **314** rotates along the screw thread of the second link shaft **317** to stretch or extend the length.

The first driving assembly **320** receives the rotational driving force from the second driving assembly **310** to rotate, be stretched or extended.

The first driving assembly **320** includes a first link gear **322**, a first link shaft **325**, and a first housing **326**.

The first link gear **322** is connected to the second driving assembly **310** to receive the rotational driving force by means of the second driving assembly **310**.

The first link shaft **325** is assembled with the first link gear **322** and the first link gear **322** moves along the screw thread to stretch or extend the length.

The first housing **326** is assembled to include the first link shaft **325** therein and is assembled to enclose the outer circumferential surface of an arm assembling unit **340** which encloses the first link shaft **325**.

In the first driving assembly **320**, the first link gear **322** receives the rotational driving force to rotate along the first link shaft **235** and stretch or extend the length and the first housing **326** is also stretched or extended along the arm assembling unit **340** as the first link shaft **325** is stretched or extended.

The lead screw **330** converts the rotational driving force of the second driving assembly **310** and the first driving assembly **320** into a linear motion.

The lead screw **330** includes a first screw **334**, a second screw **332**, and a bracket **336**.

The first screw **334** rotates along a pitch interval by the rotation of the second driving assembly **310** and the first driving assembly **320**.

The second screw **332** is connected to be in contact with the tilting unit **400** and rotates with the first screw **334** engaged therewith by the rotation of the first screw **334**.

The bracket **336** connects the first screw **334** and the second screw **332** and supports the first screw **334** and the second screw **332**.

The arm unit **300** further includes an arm assembling unit **340** which accommodates and fixes the second driving assembly **310**, the first driving assembly **320**, and the lead screw **330**.

The arm assembling unit **340** includes link bodies **342** and **344** which are assembled to fix the first link gear **322** of the first driving assembly **320** and the second link gear **324** of the second driving assembly **310** to be in contact with each other and the lead guide unit **347** formed on the link bodies **342** and **344**.

The tilting unit **400** tilts the display mount **100** in coordination with the stretching or extending operation of the arm unit **300**. The tilting unit **400** may tilt the display mount **100** according to the rotation from the lead screw **330**. Accordingly, the tilting unit **400** adjusts an angle of the display **20** in accordance with a field of vision.

A tilting angle of the tilting unit **400** may be adjusted by rotating a worm wheel which is perpendicularly connected to the lead screw **330** by the rotation of the lead screw **330** according to the linear motion of the arm unit **300**. Here, the tilting unit **400** may be implemented by the worm wheel, but is not necessarily limited thereto and may be implemented by a wheel which is engaged with the lead screw **330** to tilt the display mount **100** connected to the tilting unit **400**.

FIGS. **2** to **7** are views specifically illustrating components of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

FIG. **2** is a view illustrating entire components of a display mounting device for posture correction according to an exemplary embodiment of the present invention and FIG. **3** is a view illustrating main components of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

The display mounting device **10** for posture correction includes a display mount **100**, a driving motor **200**, an arm unit **300**, and a tilting unit **400**. The display mounting device **10** for posture correction may omit some components among various components which are exemplarily illustrated in FIG. **2** or may further include other component.

The display mount **100**, the driving motor **200**, the arm unit **300**, and the tilting unit **400** are provided in a mount housing **500**. Here, the mount housing **500** is a component which forms an outer appearance of the display mounting device **10** for posture correction.

The display mount **100** may install and fix the display **20** to mount the display **20** to be used by the user.

The driving motor **200** may provide a driving force to horizontally/vertically move the display **20** equipped in the display mount **10** and adjust a tilting angle.

The driving motor **200** may provide a driving force required to linearly move the display **20** in a predetermined direction and adjust the tilting angle of the display **20**.

An output to smoothly drive the driving motor **200** is determined according to a weight of the display **20** to be equipped so that the display mounting device **10** for posture correction determines a maximum weight of the display **20** to be equipped in advance and selects a driving motor **200** having an appropriate output according to the weight.

Further, the driving motor **200** is roughly divided into a DC motor and an AC motor and there are various driving motors according to a durability and a driving precision so that it is desirable to select an appropriate motor in accordance with the environment in which the display mounting device **10** for posture correction is used. However, when it is considered that a driving device for the display mounting device of the present disclosure is used for the display mounting device **10** which is installed on a TV stand and a size of the display mounting device **10** is not large, it is desirable to select a driving motor **200** which is not large and also desirable to select a driving motor **200** which has a low noise rather than the large driving force.

In the display mounting device **10** for posture correction, the linear motion such as horizontal/vertical movement and a rotational motion such as tilting angle adjustment need to be simultaneously performed by one driving motor **200**. Further, the driving motor **200** is a heavier component among the components of the display mounting device **10** so that in order to stably operate the display mounting device **10**, the driving motor **200** may be provided below the display mounting device **10** to be adjacent to the fixing mount **600** which fixes the mounting device.

The arm unit **300** converts the rotational driving force of the driving motor **200** into a linear driving force to move the equipped display **20** in a predetermined direction, that is, a direction in which the horizontal movement and the vertical movement are simultaneously performed.

The arm unit **300** converts the rotational motion generated from the driving motor **200** into a linear motion. A configuration which converts the linear motion into the rotational motion is roughly divided into a ball screw and a lead screw. The ball screw is precisely and smoothly driven, but is expensive and the lead screw has a less durability but is cheap so that the screws may be selected according to the environment and the purpose that the display mounting device **10** is used.

It may be more effective for he display mounting device **10** to use a lead screw **330** having a relatively low noise, a low price, and a relatively simple configuration, but is not necessarily limited thereto.

It is effective that the display mounting device **10** performs the linear movement and adjust the tilting angle by one driving motor **200** and the display **20** not only horizontally moves, but also vertically moves so that in order to efficiently perform vertical motion and horizontal motion at one time, the linear motion is desirably performed by being tilted at a predetermined angle.

Accordingly, the arm unit **300** of the present invention connects the second driving assembly **310**, the first driving assembly **320**, and the lead screw **330** which transmit the rotational driving force to the driving motor **200** provided therebelow to provide the driving force.

The tilting unit **400** interworks with the arm unit **300** and adjusts the tilting angle of the display **20** according to the linear motion of the arm unit **300**.

According to the exemplary embodiment of the present invention, the tilting unit **400** includes a tilting wheel **410** and a tilting shaft **420**. The tilting unit **400** may omit some components among various components which are exemplarily illustrated in FIG. **2** or may further include other component.

The tilting wheel **410** rotates by being engaged with the first link gear **332** of the lead screw **330** and is implemented by a worm wheel.

The tilting shaft **420** is coupled to pass through a center of the tilting wheel **410** and is connected to the display mount **10** to tilt the display mount **100** while rotating together by the rotation of the tilting wheel **410**. Specifically, the tilting shaft **420** forms a protrusion on a side surface to be slidably coupled to a groove formed on the display mount **100** to be fixed.

The tilting unit **400** adjusts the tilting angle of the display **20** in coordination with the linear motion of the arm unit **300**. When the display **20** moves toward the user and is maintained in a vertical state, a posture that looks at the display **20** is not normal as well as inconvenient to use so that it is necessary to appropriately maintain a user's viewing angle for the display **20** by tilting an upper portion of the display **20** toward the user while moving the display **20** toward the user. To this end, it is necessary to adjust the tilting angle of the display **20** in coordination with the linear motion by the arm unit **300** and the tilting angle may be adjusted by the tilting unit **400**.

In order to adjust the tilting angle using one driving motor **200**, one end of the second driving assembly **310** is coupled to the driving motor **200** and the other end is connected to the first driving assembly **320** and the length of the arm unit **300** may be stretched or extended while rotating the lead screw **330** by the second driving assembly **310** and the first driving assembly **320**. Here, the lead screw **330** rotates to rotate the worm wheel of the tilting unit **400** to tilt the display **20**. That is, the lead screw **330** and the tilting unit **400** interwork to convert the linear motion into the rotational motion, which is used to adjust the tilting angle by means of the worm wheel in the tilting unit **400**.

Referring to FIG. **2**, the mount housing **500** is a component which forms an outer appearance of the display mounting device **10** for posture correction. The mount housing **500** is formed to have a cylindrical shape to provide a design element and increase a storage efficiency of the components accommodated therein, such as the driving motor **200**, the arm unit **300**, and the tilting unit **400** and reduce the entire device size. However, the outer appearance of the display mounting device **10** is not necessarily limited thereto.

The mount housing **500** includes a first column part **510**, a second column part **520**, a third column part **530**, and a fourth column part **540**. The mount housing **500** may omit some components among various components which are exemplarily illustrated in FIG. **2** or may additionally include other component.

The first column parts **510***a* and **510***b* form an outer appearance of the outermost part of the display mounting device **10** and the fourth column parts **540***a* and **540***b* are assembled in the first column parts **510***a* and **510***b*.

Here, the driving motor **200** and the second driving assembly **310** of the arm unit **300** may be fixed to the fourth column parts **540***a* and **540***b*.

The second column parts **520***a* and **520***b* are assembled on the upper ends of the first column parts **510***a* and **510***b* and the third column parts **530***a* and **530***b* are assembled on the upper ends of the second column parts **520***a* and **520***b*. Here, when the arm unit **300** is stretched, the second column parts **520***a* and **520***b* are stretched along the first column parts **510***a* and **510***b* and the third column parts **530***a* and **530***b* are stretched along the second column parts **520***a* and **520***b*. By doing this, the display mounting device **10** for posture correction may be extended or contracted in three stages, but is not necessarily limited thereto and may be extended or contracted in a plurality of stages by changing a structure of the gear provided in the arm unit **300** and a structure of the mount housing.

A fixing mount **600** may fix the display mounting device **10** to a desk or a TV stand to be installed. The fixing mount **600** may be implemented by any component which fixes the display mounting device **10** and may be provided as a clamp to stably install the display **20** in consideration of the weight of the display **20**, but is not necessarily limited thereto.

The fixing mount **600** may be fixed to be connected to the driving motor **200** and provided in the first column parts **510***a* and **510***b*.

According to the exemplary embodiment of the present invention, a position detecting unit **30** and a control unit **32** may be located in the fixing mount **600**, but it is not necessarily limited thereto.

According to the exemplary embodiment of the present invention, as long as the fixing mount fixes the display mounting device **10**, the shape of the fixing mount **600** is not specifically limited, and the fixing mount may be provided as a clamp to stably install the display **20** in consideration of the weight of the display **20**, but is not necessarily limited thereto.

Further, the environment that the display mounting device **10** is installed may vary so that an extension block (not illustrated) which extends the driving device in a vertical direction and a horizontal direction may be further installed. The extension block may be manufactured to have the same shape as the mount housing **500** to extend the driving device in a vertical direction and may be manufactured to have a planar shape to extend the driving device in a horizontal direction, but is not necessarily limited thereto. Specifically, the extension block has a predetermined length and a predetermined height to adjust a height and a depth of the display mounting device **10** and may be located between the driving motor **200** and the fixing mount **600**. For example, the extension block is located in a horizontal direction to form the driving motor **200** and the arm unit **300** to be formed in front of or behind the position fixed by the fixing mount **600**.

FIG. **4** is a view illustrating a second driving assembly of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

The second driving assembly **310** includes a rotary gear **312**, a second link gear **314**, a rotary shaft **318**, a second link shaft **317**, and a second housing **319**. The second driving assembly **310** may omit some components among various components which are exemplarily illustrated in FIG. **4** or may further include other component.

The rotary gear **312** is located to be in contact with the driving gear **210** of the driving motor **200** and receives a power generated by the driving motor **200**. Here, the rotary gear **312** forms protrusions with the same interval as the driving gear **210** to be engaged and rotate to transmit the power without causing the energy loss.

According to the exemplary embodiment of the present invention, the rotary gear **312** may be formed as a spur gear, but is not necessarily limited thereto.

The rotary gear **312** may be fixed to the second housing **319**.

According to the exemplary embodiment of the present invention, the rotary gear **312** is coupled to one surface of the second housing **319** and coupled by forming grooves therein. For example, the rotary gear **312** forms a hexagonal shape therein and forms grooves on two facing surfaces to be coupled and fixed to the second housing **319**. Here, an inner shape of the rotary gear **312** is not necessarily limited to the hexagonal shape and may be formed to have the same shape as the shape of an outer surface of the rotary shaft **318**.

The second link gear **314** is connected to the rotary shaft **318** and fixed to the rotary gear **312** to rotate as the rotary shaft **318** rotates. Here, the second link gear **314** forms protrusions having the same interval as the first link gear **322** to be engaged and rotate to transmit the power to the first link gear **322** without causing the energy loss.

According to the exemplary embodiment of the present invention, even though it is illustrated that the second link gear **314** forms a hexagonal shape therein, it is not necessarily limited thereto and may be assembled by forming the same shape as the shape of the outer circumferential surface of the rotary shaft **318**.

The rotary shaft **318** forms a hexagonal shape. Here, even though it is illustrated that the rotary shaft **318** forms a hexagonal shape, it is not limited thereto and may form a polygonal shape.

According to the exemplary embodiment of the present invention, when the rotary shaft **318** is formed in a circle, the rotary shaft may not rotate as the second housing **319** coupled to the rotary shaft **318** rotates. Accordingly, the rotary shaft **318** is formed to have a polygonal shape to be coupled to the second housing **319** to rotate together as the second housing **319** rotates.

The rotary shaft **318** forms grooves on two opposing surfaces. Here, the grooves formed on two opposing surfaces may be coupled to be in contact with the protrusions formed on the inside of the second housing **319**. Accordingly, the rotary shaft **318** is coupled to the grooves formed on two opposing surfaces through the protrusions to rotate together by the rotation of the second housing **319**.

The second link shaft **317** includes a second link bracket **315** and a second shaft **316**.

The second link bracket **315** may be formed to fix the second driving assembly **310** to the mount housing **500**. For example, the second link bracket **315** is formed in a rectangular parallelepiped shape and forms grooves except for the center of each side surface and assembled and fixed to the house housing **500** through the groove formed except for the center.

The second shaft **316** is coupled to a lower end of the second link bracket **315** and forms a screw thread around the shaft formed in a cylindrical shape. The screw thread formed on the second shaft **316** may be implemented to rotate by being engaged with the screw thread formed inside the rotary shaft **318**, which stretches or extends the second link shaft **317**.

The second housing **319** is connected to the rotary gear **312** and is implemented to enclose the rotary shaft **318**. Specifically, the second housing **319** is coupled to locate the rotary shaft **318** therein and forms the same inner shape so as to transmit the rotational driving force received from the rotary gear **312** to the rotary shaft **318**.

According to the exemplary embodiment of the present invention, even though it is illustrated that the second housing **319** is formed in a cylindrical shape, it is not necessarily limited thereto.

FIG. **5** is a view illustrating a first driving assembly of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

The first driving assembly **320** includes a first link gear **322**, a first link shaft **325**, and a first housing **326**. The first driving assembly **320** may omit some components among various components which are exemplarily illustrated in FIG. **5** or may further include other component.

The first link gear **322** is located to be in contact with the second link gear **314** of the second driving assembly **310** and receives the power generated by the driving motor **200** through the second link gear **314** assembled in the rotary shaft **318** provided in the second housing **319** connected to the rotary gear **312**. Here, the first link gear **322** forms protrusions having the same interval as the second link gear **314** to be engaged and rotate to transmit the power without causing the energy loss.

The first link gear **322** forms the screw thread therein and is coupled to the first link shaft **325** to move along the screw thread formed on the first link shaft **325**.

The first link shaft **325** includes a first link bracket **323** and a first shaft **324**.

The first link bracket **323** may be formed to fix the first driving assembly **320** to the mount housing **500**. For example, the first link bracket **323** is formed in a rectangular parallelepiped shape and forms grooves except for the center of each side surface and assembled and fixed to the house housing **500** through the groove formed except for the center.

The first shaft **324** is coupled to a lower end of the first link bracket **323** and forms a screw thread around the shaft formed in a cylindrical shape. The screw thread formed on the first shaft **324** may be implemented to rotate by being engaged with the screw thread formed inside the first link gear **322**, which stretches or extends the arm unit **300**.

According to the exemplary embodiment of the present invention, the screw thread formed on the first shaft **324** may form the grooves in the length direction of the first shaft **324**. Here, the grooves formed in the length direction may be formed in an opposing position of the cylindrical first shaft **324** and may be implemented to be assembled to be in contact with the protrusions formed on the arm assembling unit **340**.

Specifically, the grooves formed in the length direction are fixed to the protrusions formed on the arm assembling unit **340** and the first shaft **324** may move along the grooves as the first link gear **322** rotates. Here, the position in which the arm assembling unit **340** is fixed may not be changed.

When the first link gear **322** and the first link shaft **325** are assembled by the arm assembling unit **340**, the first housing **326** may be implemented to enclose the upper end of the arm assembling unit **340**.

The first housing **326** is formed in a cylindrical shape and includes a cylindrical shaft **328** and a cylindrical bracket **327**.

Here, the cylindrical bracket **327** may be formed to fix the first driving assembly **320** to the mount housing **500**. For example, the cylindrical bracket **327** is formed in a cylindrical shape and forms grooves along the circle on the side surface. At this time, the cylindrical bracket may be assembled in the mount housing **500** to be fixed by means of the formed grooves.

The cylindrical shaft **328** is coupled to the lower end of the cylindrical bracket **327** and forms grooves in the shaft formed in cylindrical shape to be coupled to the arm assembling unit **340**. Here, the grooves may be formed in the length direction of the cylindrical shaft **328**, but is not necessarily limited thereto.

Even though it is illustrated that the cylindrical shaft **328** forms protrusions in the length direction in an opposing position of the outer circumferential surface, the protrusions may not be formed.

FIG. **6** is a view illustrating a lead screw of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

The lead screw **330** includes a first screw **334**, a second screw **332**, and a bracket **336**. The lead screw **330** may omit some components among various components which are exemplarily illustrated in FIG. **6** or may further include other component.

The first screw **334** may be implemented by setting the interval between pitches to be larger than the interval between pitches of the second screw **322**.

The tilting angle of the display mount **100** may be adjusted by the interval between pitches of the first screw **334** so that the larger the interval, the slower the display mount **100** moves and the smaller the interval, the faster the display mount **100** moves.

Accordingly, the lead screw **330** may adjust the angle of the display mount **100** by the interval between pitches of the first screw **334**.

The second screw **332** is coupled to be in contact with the tilting unit **400** and rotates the tilting unit **400** to being rotated by the first screw **334**.

The bracket **336** may connect the first screw **334** and the second screw **332**. Here, the bracket **336** may be coupled to be in assembled in the arm assembling unit **340**. Specifically, the bracket **336** may be coupled by the grooves formed in the arm assembling unit **340**. Further, a portion which is formed in a cylindrical shape at the upper end of the second screw **332** of the lead screw **330** may be formed to be fixed to the arm assembling unit **340** and prevents the lead screw **330** from being deviated.

FIG. **7** is a view illustrating an arm assembling unit of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

The arm assembling unit **340** includes a first link body **342**, a second link body **344**, and a lead guide unit **347**. The arm assembling unit **340** may omit some components among various components which are exemplarily illustrated in FIG. **7** or may further include other component.

The first link body **342** may be coupled to the second link body **344** to be assembled such that the second link gear **314** of the second driving assembly **310** and the first link gear **322** of the first driving assembly **320** are assembled to be engaged.

According to the exemplary embodiment of the present invention, the first link body **342** may be formed to have the same shape as the second link body **344**. Specifically, the first link body **342** may be coupled to the second link body **344** to fix the second link gear **314** and the first link gear **322** as one assembly and a cylindrical groove **348** and to this end, a cylindrical protrusion **349** may be formed in a portion to be coupled.

Here, the cylindrical protrusion **349** may be formed to have the same shape as the cylindrical groove **348**. The cylindrical protrusion is coupled to the cylindrical groove **348** without forming a space so that the first link body **342** and the second link body **344** may be fixed to be in contact with each other.

The first link body **342** may include a first arm guide **341** and a first arm body **343**. The second link body **344** may include a second arm guide **345** and a second arm body **346**.

The first arm guide **341** may be connected to the first arm body **343** equipped with the first driving assembly **320** and the second guide **345** may be connected to the second arm body **346** equipped with the second driving assembly **310**.

In the first arm guide **341**, the first shaft **324** of the first link shaft **325** of the first driving assembly **320** is located and the first arm guide **341** is assembled with the second arm guide **345** to be fixed. Here, in the first arm guide **341** and the second arm guide **345**, the protrusion have the same shape as the groove is formed in the length direction of the first axis **324** formed on the screw thread of the first shaft **324** to couple and fix the groove and the protrusion.

The first arm body **343** and the second arm body **346** may form a plurality of grooves to be fixed to the mount housing **500**. According to the exemplary embodiment of the present invention, the first arm body **343** and the second arm body **346** may form three grooves, but is not necessarily limited thereto.

The first arm body **343** and the second arm body **346** are assembled such that the second driving assembly **310** and the first driving assembly **320** are engaged.

The second link body **344** may have a lead guide unit **347**. Specifically, the second arm body **346** may have the lead guide unit **347**. Here, the lead guide unit **347** does not overlap a portion in which the second link gear **314** assembled in the second arm body **346** and the first link gear **322** are assembled to be fixed and may be located at the center of the second arm body **346**, but is not necessarily limited thereto.

The lead guide unit **347** is a portion to which the lead screw **330** is rotatably assembled to be coupled and forms a screw thread to rotate the first screw **334** of the lead screw **330** as the second driving assembly **310** and the first driving assembly **320** linearly moves by the second link gear **314** and the first link gear **322**. Specifically, the screw thread formed on the lead guide unit **347** may be formed to move the lead guide unit **347** along the pitch of the first screw **334**.

FIGS. **8** and **9** are views illustrating coupling between components of an arm unit of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

FIG. **8** is a view illustrating a form for assembling the second driving assembly **310**, the first driving assembly **320**, and the lead screw **330** to the arm assembly **340** according to the exemplary embodiment of the present invention. FIG. **9** is a view illustrating a form that the second driving assembly **310**, the first driving assembly **320**, and the lead screw **330** are assembled to the arm assembly **340** according to the exemplary embodiment of the present invention.

The second assembly **310** and the first driving assembly **320** may be assembled as one assembly by the first link body **342** and the second link body **344**. Specifically, the arm assembling unit **340** may be assembled such that the second link gear **314** of the second driving assembly **310** and the first link gear **322** of the first driving assembly **320** are engaged to be in contact with each other and the rotational driving force is transmitted to the first link gear **322** from the second link gear **314**.

The arm assembly **340** may be located to be provided in the first arm body **343** and the second arm body **346** such that the second link gear **314** of the second driving assembly **310** and the first link gear **322** of the first driving assembly **320** are engaged. Here, in the arm assembly **340**, the first link body **342** and the second link body **344** may be coupled in a state in which the second link gear **314** is coupled to the rotary shaft **318** and the second link shaft **317** is located in the rotary shaft **318** and in a state in which the first link gear **322** is coupled to the first link shaft **328**.

Here, the first housing **326** is coupled and fixed to the outer circumferential surface of the first arm guide **341** and the second arm guide **345** coupled when the first link body **342** and the second link body **344** of the arm assembly **340** are coupled.

FIG. **10** is a view illustrating an arm unit and a tilting unit of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

Referring to FIG. **10**, the lead screw **330** of the arm unit **300** and the tilting unit **400** are coupled.

The tilting unit **400** forms a wheel shaped gear and forms a cylindrical tilting shaft to be connected to the display mount **100** to be driven.

The tilting shaft may form a protrusion to be coupled and fixed to the display mount **100** and may be fixed by being coupled to the groove formed in the display mount **100**. The protrusion of the tilting shaft and the groove of the display mount **100** are coupled to restrict the movement of the display mount **100** and the tilting shaft moves in accordance with the movement of the wheel shaped gear of the tilting unit **400** to move the display mount **100**.

Here, the arm unit **300** and the tilting unit **400** may be implemented by a worm and a worm gear. The worm of the arm unit **300** forms the screw thread and the worm wheel of the tilting unit **400** is engaged with the worm, but it is not limited thereto.

FIG. **11** includes diagrams showing a display mount and a mounting jig of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

(a) of FIG. **11** is a view illustrating a mounting jig, (b) of FIG. **11** is a view illustrating a display mount, and (c) of FIG. **11** is a view illustrating the coupling of the mounting jig and the display mount.

The display mount **100** may fix the display **20** to mount the display **20**.

The mounting jig **110** may be fastened to the display **20** and the display mount **100** to connect the display **20** and the display mount **100**.

The display mount **100** of the present invention is a configuration which provides and fixes the display **20** including a monitor, a TV, and a mobile device to be used by the user. Even though a stand which fixes the display **20** to a predetermined position is attached to the display **20**, a fixing unit is generally provided on a rear surface of the display **20** to fix the display **20** to the mounting device. The display mount **100** installs and fixes the display **20** by means of the fixing unit provided on the rear surface of the display **20**. The fixing unit is generally provided in the standard called VESA and the display mount **100** is desirably manufactured in accordance with the VESA standard. According to the VESA standard, generally, a bolt groove having a predetermined shape is provided to closely attach and fix the rear fixing unit with the bolt. During the fixing with the bold, the display **20** needs to be held, so that the fastening process is not easy.

Accordingly, the display mount **100** of the present invention may use the mounting jig **110** to be coupled to the rear surface of the display **20** and the display mount **100** to install the display **20** by one touch. For example, after installing one side of the mounting jig **110** in the display **20** and installing the other side in the display mount **100**, the mounting and fixing can be made just by lifting the display **20** to be fitted into the display mount **100**. Of course, any method is irrelevant as long as it is a one-touch coupling method, but is not limited to the above-described method.

According to the exemplary embodiment of the present invention, a portion of the mounting jig **110** which is coupled to the display mount **100** protrudes to form grooves on both sides and the mounting jig may be slidably coupled to the display mount **100** along the grooves formed on both sides of the protruding portion, but is not necessarily limited thereto.

FIGS. **12** and **13** are views specifically illustrating stretching and extension of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

FIG. **12** is a view illustrating rotation of gear to stretch and extend a display mounting device for posture correction according to the exemplary embodiment of the present invention and FIG. **13** is a view illustrating an extended arm unit of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

In the display mounting device **10** for posture correction, when the gear **200** operates, the arm unit **300** may be stretched or extended as the driving gear **210** formed in the gear **200** rotates. For example, in the display driving device **10** for posture correction, when the driving gear **210** rotates to the left, the rotary gear **312** engaged with the driving gear **210** may rotate to the right. When the rotary gear **312** rotates to the right, the second link gear **314** rotates to the right while the rotary shaft **318** rotates to the right by the second housing **319** connected to the rotary gear **312**. When the second link gear **314** rotates to the right, the first link gear **322** engaged with the second link gear **314** rotates to the left. The arm unit **300** may be extended by the above-described process and thus the lead screw **330** may rotate. At this time, the lead screw **330** rotates to the left and the tilting unit **400** connected perpendicularly to the lead screw **330** rotate to the right so that an angle of the display mount **100** may be reduced. Here, when the angle of the display mount **100** is reduced, it means that the display mount **100** moves to be directed to the lower end.

The arm unit **300** of the display mounting device **10** for posture correction is extended and the angle of the display mount **100** is adjusted by the above-described process. The extended arm unit **300** may return to its original state and the angle of the display mount **100** may also return to its original state as the driving gear **210** rotates in an opposite direction.

The above-described process is an example for explaining the present invention so that it is not necessarily limited to those described above and may be implemented to the contrary or a position of each gear is changed to stretch the arm unit **300** or change the angle of the display mount **100**.

The arm unit **300** is a configuration which moves the display **20** to correct the posture of the user or adjust the position of the display **20** to be customized according to the usage environment of the display **20**. The position of the display **20** is divided into a vertical position on the desk and a horizontal position to the user and the vertical and horizontal positions can be adjusted in the terms of the distance between the user and the display **20**. However, in terms of the posture correction of the user, the head of the user needs to be moved so that the tinting angle of the display **20** needs to be adjusted in addition to the movement in terms of the distance.

It is desirable to obliquely move the display **20** toward the face of the user rather than a movement trajectory of the display **20** which moves vertically or horizontally, separately or sequentially. In other words, in order to move the head of the user to improve the text neck disease, when an upper end of the display **20** is inclined toward the user while increasing a vertical distance of the display **20** from the desk and reducing a horizontal distance with the user, the head is tilted back so that the posture of the user may be correctly corrected.

Accordingly, the display mounting device **10** may adjust the tilting angle of the display **20** using the tilting unit **400** at one time while stretching or contracting the length using the arm unit **300** by combining the arm unit **300** and the tilting unit **400**. When a driving for each of the components is provided, a degree of freedom of the movement trajectory of the display **20** can be increased, but it may be disadvantageous because the control is complex and the manufacturing cost is increased.

According to the exemplary embodiment of the present invention, the display mounting device **10** may be configured not only to move the display **20** toward the user, but also tilt the display to the left and right using the arm unit **300** and the tilting unit **400**.

Referring to FIG. **13**, the driving motor **200** is fixed to the fourth column parts **540***a* and **540***b* provided in the first column parts **510***a* and **510***b* and the second driving assembly **310** of the arm unit **300** may be fixed thereto.

In the first column parts **510***a* and **510***b*, the first housing **326** of the first driving assembly **320** and the second housing **319** of the second driving assembly **310** may be located.

In the second column parts **520***a* and **520***b*, the arm assembling unit **340** is located and the first arm guide **341** and the second arm guide **345** which enclose the first link gear **322** and the first link shaft **325** fixed to the arm assembling unit **340** may be located.

In the third column parts **530***a* and **530***b*, the first link shaft **325** of the first driving assembly **320** and the lead screw **330** may be located.

FIGS. **14** and **15** are views illustrating a display mounting control system using a display mounting device for posture correction according to an exemplary embodiment of the present invention.

FIG. **14** is a view illustrating a display mounting control system using a display mounting device for posture correction according to an exemplary embodiment of the present invention and FIG. **15** is a view illustrating an extended arm unit and a tilted display mount of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

The display mounting control system **40** includes a display mounting device **10**, a position detecting unit **30**, and a control unit **32**. The display mounting control system **40** may omit some components among various components which are exemplarily illustrated in FIGS. **14** and **15** or may additionally include other component.

In the display mounting control system **40**, the display mounting device **10** is equipped in the display mount **100** to which the display **20** to be used by the user is equipped and fixed and the position of the user is detected by the position detecting unit **30** with respect to the equipped display **20**. In the display mounting control system **40**, the posture of the user, such as a bending angle of the neck of the user, may be determined on the basis of the detected position and the display **20** is moved in a direction in which a horizontal distance and a vertical distance of the display **20** are simultaneously adjusted by the display mounting device **10** to correct the posture of the user determined by the control unit **32**, and the tilting angle of the display **20** is adjusted within a predetermined range in association therewith.

The position of the user indicates a position according to a distance between the user and the position detecting unit **30** with respect to the display **20** and may be provided separately for the head, the neck, and the body.

The position detecting unit **30** may detect the position of the user with respect to the display **20** mounted on the display mount **100** to determine the posture of the user.

The display mounting device **10** adjusts the position of the display **20** in accordance with the environment in which the user uses the display **20** and moves the display **20** to correct the posture of the user.

The control unit **32** controls an overall operation of the display mounting device **10** to determine the posture of the user on the basis of the user position detected by the position detecting unit and control the display mounting device **10** to adjust the movement of the display **20**, thereby correcting the posture of the user.

According to the exemplary embodiment of the present invention, the display mounting control system **40** determines a first region corresponding to a face of the user, a second region corresponding to a chest, and a third region corresponding to the neck from a plurality of distance information of the image acquired by an LED proximity sensor and an IR distance sensor of the position detecting unit **30** and the control unit **32** diagnoses the posture of the user to drive the driving motor or issue an alarm to the user in consideration of distribution of feature values belonging to each region.

The display mounting control system **40** may distinguish the first region, the second region, and the third region by the image processing, for the above-described purpose. For example, it is confirmed that the posture is changed to a posture that the head is leaned forward for 10 minutes by checking that a first region distance value of 50 cm, a second region distance value of 53 cm, and a third region distance value of 52 cm at the time of 13:00 are changed to the first region distance value of 48 cm, the second region distance value of 52 cm, and the third region distance value of 51 cm at the time of 13:10.

The display mounting control system **40** recognizes the posture of the user and determines the posture to adaptively control the user. Specifically, the display mounting control system **40** utilizes a single posture recognizing sensor or a plurality of posture recognizing sensors in the position detecting unit **30** to measure the posture in front of the user. Here, the posture recognizing sensor may be implemented by a distance sensor and also implemented by a sensor using the infrared ray or laser. For example, the posture recognizing sensor may be implemented by a 3D time of flight (TOF) sensor, but is not necessarily limited thereto.

According to the exemplary embodiment of the present invention, when the position detecting unit **30** uses a single sensor, the display mounting control system **40** may measure a distance from the posture recognizing sensor to the user's head to measure the posture of the user. When the position detecting unit **30** uses a plurality of sensors, the posture of the user may be measured by measuring a distance from the posture recognizing sensor to the torso of the user.

Referring to FIGS. **14** and **15**, even though it is illustrated that the position detecting unit **30** of the display mounting control system **40** uses a plurality of posture recognizing sensors, it is not necessarily limited thereto.

The display mounting control system **40** records the posture determined by the position detecting unit **30** in the chronological order through the control unit **32**. At this time, the determined posture allows to determine that the seat is empty, the head is gradually tilted forward, and the user feels uncomfortable due to the posture guiding, but is not necessarily limited thereto.

Further, the control unit **32** may optimize the movement distance and the speed of the display **20** for the user, in accordance with the determination. For example, from a long-term point of view, the movement distance and the speed of the display **20** may be optimized for the user. The long-term view may be set to 12 weeks or longer because a general musculoskeletal rehabilitation training takes 12 weeks, but is not necessarily limited thereto.

The position detecting unit **30** may detect the position of the user who uses the display with respect to the display.

Referring to FIGS. **14** and **15**, the position detecting unit **30** may be located at a lower end of the display mounting device for posture correction, but is not necessarily limited thereto and may be located in a position that the distance from the user can be measured.

The position detecting unit **30** may utilize at least one posture recognizing sensor to measure the posture in front of the user by dividing the posture into at least one region. Here, the posture recognizing sensor may measure a distance to a face position of the user.

The position detecting unit **30** may divide the region into a first region indicating a position of a user's face, a second region indicating a position of the user's torso, and a third region indicating a position of the user's neck to determine the distance from the user through at least one posture recognizing sensor. The position detecting unit **30** generates distance information from the user from the first region, the second region, and the third region to transmit the distance information to the control unit **32**.

The control unit **32** determines the posture of the user on the basis of the position of the user detected by the position detecting unit **30** and controls the display mounting device **10** to correct the posture of the user.

The control unit **32** records the position of the user detected by the position detecting unit **30** at every time to determine the state of the user and distinguishes at least one region to diagnose the posture of the user in consideration of the distribution of the feature values belonging to each region according to the state of the user at every time to calculate an adjustment value to adjust the display mounting device **10**.

According to the exemplary embodiment of the present invention, the adjustment value may include a speed at which the driving motor **200** is driven, a left or right driving direction to drive the driving gear **210**, and a time when the driving motor **20** is driven, but is not necessarily limited thereto.

The control unit **32** may drive the driving motor **200** using the adjustment value calculated by a predetermined reference according to the posture of the user to control the position of the display.

The control unit **32** adjusts the movement distance and the speed of the display by the adjustment value and stores the movement distance and the speed of the display **20** according to the adjustment value to predict and provide a posture habit change of the user and a disease according to the posture habit. Here, the movement distance and the speed of the display may be determined by adjusting the movement distance and the moving speed of the arm unit **300** of the display mounting device **10**.

The control unit **32** may vary the speed according to the movement distance. For example, the control unit **32** adjusts the display mounting device **10** at a high speed in a predetermined zone and at a slow speed in the other zone and also adjust the display mounting device for every user or every posture at a variable speed.

The display mounting control system **40** collects the user's position detected by the position detecting unit **30** in real-time and includes a notification unit (not illustrated for notifying the user when the distance between the user and the display **20** is deviated from a predetermined range.

The position detecting unit **30** may detect the position of the user with respect to the display **20**. The position of the user is used to determine the posture of the user by the control unit **32** so that it is desirable to detect various positions in a plurality of points or portions of the user, rather than simply detecting only one point of the user, with respect to the display **20**. In order to detect the position of the user, various sensors may be utilized, such as a sensor using infrared ray or laser or a time of flight (TOF) sensor. It is necessary to detect the position from a plurality of portions of the user, so that a sensor which detects various positions at one time such as a TOF sensor is desirable rather than a sensor which detects a single position. Specifically, it is important to identify whether the posture of the user is a text neck so that it is important to essentially identify the positions of the face, the neck, and the torso of the user.

Even though an example that the position detecting unit **30** which detects the position of the user is installed on a front lower end of the display mounting device **10** has been illustrated, the detecting unit may be provided as an attached type to be provided on a lower end or an upper end of the display **20**. However, regardless of the installation position, in order to accurately measure the position of the user, a basic setting and a correcting process may be desirably performed.

According to the exemplary embodiment of the present invention, a plurality of position detecting units **30** is provided to measure the distances to the user's head, neck, and torso for every region or at least one position detecting unit is provided to move up and down and left and right to measure the distance from the head to the torso of the user, but is not necessarily limited to those described above.

The display mounting device **10** desirably moves within a predetermined range because the display **20** has its own weight and the movement beyond the predetermined range has no meaning. It is not possible to set the horizontal distance, the vertical distance, and the tilting angle that the display mounting device **10** moves the display **20** to infinite, so that it is desirable to restrict the movement within a predetermined range. In the case of the horizontal distance, since the display mounting device **10** is generally installed on the end of the desk, it is reasonable to determine the horizontal distance with respect to the vertical length of the desk and the size and the viewing angle of the display.

According to the exemplary embodiment of the present invention, in consideration of the color and the letter recognition, the viewing angle may be set to 35 degrees to the left and right. In consideration of the weight of the display, the posture of the user, and the limitation of adjusting the tilting angle, the maximum tilting angle may be set to 30 degrees. Even though the vertical distance is related to the user's seating height, the height of the display mounting device of the present invention can be relatively freely adjusted so that the range of the vertical distance may be derived by the limit of the tilting angle. The range of the horizontal distance can be set to 0 to (D−S/2 tan 35) by comprehensively considering the above-description. Of course, the viewing angle can be adjusted in consideration of the characteristic of the user's eyesight. A limit of the tilting angle is 30 degrees so that the vertical distance may be set to 0 to (S*sin 30)/(2 tan 35). That is, the range (W**1**) of the horizontal movement distance is adjusted to 0~(D−S/2 tan 35), the range (W**2**) of the vertical movement distance is adjusted to 0 (S*sin 30)/(2 tan 35), and the tilting angle (t**3**) is adjusted to 0 degree to 30 degrees.

The display mounting device **10** is configured not only to move the display toward the user, but also to tilt the display to the left and right, but it is desirable to determine whether to add the display mounting device **10** in terms of the usefulness based on the manufacturing cost and the easiness of the control.

The control unit **32** is a configuration which controls the display mounting device **10** to correct the posture of the user. The control unit **32** determines the posture of the user using the position of the user detected by the user position detecting unit **30**. For example, the control unit **32** detects a first region indicating a distance from a user's face, a second region indicating a distance from the user's neck, and a third region indicating a distance from the user's torso and extracts an angle a**2** to determine the posture of the user, that is, whether the posture is a text beck, after connecting the positions.

The angle a**2** is extracted from the position of the user so that the angle a**2** is smaller than a normal angle a**1** so that a process of calculating a correction value by several tests is essential to determine an accurate posture. Further, when a specific position is detected, a position of the face, the neck, and the torso which is a position of the user necessary to determine the posture of the user is estimated from the position to be used. The calibration through the test is essential.

The control unit **32** sets a movement trajectory and a movement cycle of the display **20** in advance to automatically control the display **20**. For example, if the display **20** is controlled to move back and forth with a predetermined cycle to relax or strengthen the muscles around the neck, the user may unconsciously move the head back and forth or nod up and down during the working so that the muscles around the neck may be relaxed or strengthened without awareness. According to the present invention, even though a correcting mode for correcting the posture of the user and a training mode for relaxing or strengthening the muscles around the neck are exemplified, user customized modes may be designed by varying the movement trajectory and the cycle or a separate mode may be newly created.

The display mounting device **10** may further include a notification unit which is installed in a noticeable position by the user such as a front portion of the display mounting device **10** to provide several events or notification generated from the display mounting device **10** to the user.

According to the exemplary embodiment of the present invention, the notification unit may be provided as an LCD panel having an appropriate size to transmit the notification for a mode which is being driven or a posture of the user as an image or a text or also transmit a simple notification such as whether the power is on/off or whether the posture of the user is appropriate, as a color or a number of turned on LEDs, using a plurality of LEDs.

The display mounting device **10** may further include a wireless module which transmits various information of the display mounting device **10** to a terminal registered by the user, such as a smart phone or a tablet or transmits and controls contents controlled by the user, such as position adjustment of the display **20**, setting of the movement trajectory, cycle setting, or setting of the training mode or the correcting mode to the display mounting device through the user's terminal, using an application of a predetermined UI.

According to the exemplary embodiment of the present invention, the display mounting control system **40** determines the posture of the user on the basis of the positions of the face, the neck, and the torso, and further determines the posture on the basis of the position that the face, the neck, and the torso are deviated from the display **20** to the left or right. Specifically, the position detecting unit **30** may measure distances of the face, the neck, and the torso which are deviated from the center of the display **20** to the left or right and determines a posture that is tilted sideways or a posture that the head is tilted according to the deviated distance. Therefore, the display mounting control system **40** may determine all the up, down, left, and right postures of the user and move the display **20** with respect to the postures. Further, the display mounting control system **40** assigns a weight to the distances from the face, the neck, and the torso and the distances of the face, the neck, and the torso which are deviated from the center of the display **20** acquired by the position detecting unit **30** to set a degree of moving the display mounting device **10**. Here, the weight may be set on the basis of the correction portion according to the health condition of the user and a portion that the distance deviated from the optimal state is large and a portion considered to maintain a correct portion may be differently set according to a current condition of the user to be used to train the posture and the posture may be corrected for each portion of the user.

The control unit **32** may record the posture determined by the position detecting unit **30** in a chronological order. At this time, the determined posture allows to determine that the seat is empty, the head is gradually tilted forward, and the user feels uncomfortable due to the posture guiding, but is not necessarily limited thereto.

According to another exemplary embodiment of the present invention, the control unit or a processor of the present exemplary embodiment may calculate a posture index indicating whether the posture of the user is correct using relational factors such as the distance from each point (face, neck, and torso) of the user and a current position (height or angle) of the monitor. Further, the posture index may be calculated by further considering the previously input setting value, that is, a user profile, such as the age, the gender, and the height of the user. For example, a distance relational value which is optimized by various simulations performed for the relational factors is calculated as a reference value and the posture index may be calculated by an error from the actual measurement value.

FIG. **16** is a view illustrating a state diagram of a display mounting control system of a display mounting device for posture correction according to an exemplary embodiment of the present invention.

The state diagram **1500** includes an unknown stage **1510**, a user exist stage **1520**, a bad posture stage **1530**, a move-to-up stage **1540**, and move-to-home stage **1550**.

The unknown stage **1510** is a state in which the position of the user is not known so that the position detecting unit **30** of the display mounting control system **40** may indicate a state in which the user is not located within a measurement distance.

The user exist stage **1520** is a state in which the user exists so that the position detecting unit **30** of the display mounting control system **40** may indicate a state in which the user is located within a measurement distance.

The bad posture stage **1530** indicates that a state in which the posture of the user is bad and the user may indicate a state that the user is located with a bad posture within the measurement distance by the position detecting unit **30** of the display mounting control system **40**.

The move-to-up stage **1540** indicates that a state in which the posture of the user moves up and the user may indicate a state that the position of the face of the user moves up within the measurement distance by the position detecting unit **30** of the display mounting control system **40**.

The move-to-home stage **1550** indicates the movement to a home position and indicates that the user is moved to maintain a correct posture by the display mounting control system **40**.

However, the state of the state diagram **1500** is not necessarily limited to those described above.

According to the exemplary embodiment of the present invention, when the posture of the user is unstable in the unknown stage **1510**, the state diagram **1500** may change the state to the user exist stage **1520**.

When the user concentrates in the user exist stage **1520** to move the posture down, the state diagram **1500** changes the state to the bad posture stage **1530**.

It is determined to adjust the display upwardly or downwardly in the bad posture stage **1530** so that the state diagram **1500** changes the state to the move-to-up stage **1540**.

When the position of the display moves in the move-to-up stage **1540** so that the posture of the user is up, the state diagram **1500** is passed and even though the position of the display is moved, when the posture of the user is down and unstable, the state diagram **1500** is failed to change the state into the move-to-home stage **1550**. Here, if it is failed, the bad posture stage **1530** is determined again to adjust the position of the display.

According to the exemplary embodiment of the present invention, the display mounting control system **40** designs a customized training by the state diagram **1500**.

When the display **20** is lifted by the display mounting control device **10**, the user may complain of discomfort at a specific height after the posture is induced for a while. This may be caused because a range of motion of the cervical spine is different for each user. Accordingly, the display mounting control system **40** may determine which posture change is shown by the user at a height of a distance which moves the display **30** and this may be confirmed by the move-to-up stage **1540** of the state diagram **1500**.

The display mounting control system **40** checks a ratio of the previous pass and failure (fail) in the bad posture stage **1530** in which the display **20** needs to be lifted to determine to increase or decrease the distance that moves the display **20**.

The display mounting control device **10** may additionally include a button that is pressed for a long time to reset the record for the customized training, on a side surface.

According to the exemplary embodiment of the present invention, the display mounting control system **40** acquires posture information during the display **20** used time and concentrated time data during the display **20** used time and transmits the acquired data to the outside in a wireless (Bluetooth) manner or a wired (USB or cable) manner.

Further, the display mounting control system **40** provides the feedback of the posture habit change to the user, predicts a musculoskeletal disease according to the posture habit to provide the predicted result to the user, provides the feedback of the immersion pattern to the user, and provides a concentration strengthening training according to the immersion pattern.

By doing this, the display mounting control system **40** may obtain the effects of reducing the industrial accident insurance premium of the company by predicting the musculoskeletal disease and enhancing the productivity of the company by the concentration strengthening training.

According to still another exemplary embodiment of the present invention, the position detecting unit **30** may calculate a first region distance, a second region distance, and a third region distance from the position detecting unit **30** on the basis of the acquired sensor value. When the position detecting unit is a TOF sensor, a distance value for every pixel may be calculated by calculating the TOF sensor value and the control unit **32** may determine a distance to a specific point (a center point) of each region as a representative distance for every region. The control unit **32** may determine the state in which the first region distance >the third region distance >the second region distance as a normal posture stage. When the time differential value with respect to at least one of the first, second, and third region distances, specifically, the first region distance is negative, the control unit **32** may be determined it as a "bad posture prestage". In the case of the bad posture prestage, the control unit **32** may transmit a warning message (a warning operation) to upwardly drive the monitor or upwardly drive the monitor a little bit and then downwardly drive the drive in its original position to the user.

Further, the third region distance is larger than the first region distance and the first region distance is smaller than the first reference value, it is a bad state in which the user bents the neck and the waist toward the monitor so that the control unit **32** determines the current posture as a "first bad posture stage". Here, the first reference value may be determined in the range of 40 to 60 cm, which may vary according to the usage environment. In this case, the control unit **32** may quickly drive the motor to upwardly move the display to switch the posture of the user to a desirable direction.

Further, even though the distance of the third region is larger than the first region distance, if the first region distance is larger than the first reference value, the control unit **32** may determine the current state as a "second bad posture stage". This is because the distance between the display and the user (head) is long, but the neck is bent. Further, the distance of the second region is farther than any one of the first region distance or the third region distance, the control unit **32** determines the current posture as a "bad posture prestage" and performs the above-described warning operation.

According to the exemplary embodiment of the present invention, the warning message notifies the user of the bad posture stage by an operation of repeating an operation of lifting or lowering the display **20** by the display mounting control device **10**, an operation of turning on/off a warning light to provide a warning to the user, an operation of driving the driving motor **200** at a very high speed to move the display mounting control device **10** at a high speed, and an operation of providing a warning sound. However, it is not necessarily limited thereto and the warning message may be provided by an operation of informing the user of the bad posture state.

FIG. **17** includes diagrams showing a noise according to an operating time of a display mounting device for posture correction.

(a) of FIG. **17** is a view illustrating a noise according to an operating time of a display mounting device for posture correction according to the existing method. (b) of FIG. **17** is a view illustrating a noise according to an operating time of a display mounting device for posture correction according to the exemplary embodiment of the present invention.

In the display mounting device for posture correction, the arm unit **30** performs the linear motion by the operation of the driving motor **200** to be stretched or extended so that the noise may be generated as the driving motor **200** operates.

Referring to (a) of FIG. **17**, in the display mounting device for posture correction of the related art, when the motor does not operate, the noise is not generated but when the operation of the motor is rapidly performed to adjust the length of the arm unit, a loud noise may be generated. At this case, the generated noise may distract the user who uses the display mounting device for posture correction.

Human hearing is sensitive to the changes so that the noise generated by the operation of the driving motor **200** of the display mounting device **10** for posture correction may distract the user who uses the display mounting device **10** for posture correction. The display mounting device **10** for posture correction of the present invention may be implemented as follows so as not to distract the user.

The display mounting device **10** for posture correction sets a maximum driving speed of the rotational driving force of the driving motor **200** according to the movement length that the arm unit **300** is stretched or extended and after gradually increasing the rotational driving force to the maximum driving speed along the movement length that the arm unit **300** is stretched or extended for a predetermined time, and then gradually decreases the rotational driving force.

Referring to (b) of FIG. **17**, in the display mounting device **10** for posture correction, the noise is not generated while the driving motor **200** does not operate and the driving motor **200** is linearly driven to adjust the length of the arm unit **300** so as not to distract the user.

As an operation noise is proportional to a rotational speed of the driving motor, the display mounting device **10** for posture correction may minimize a distraction factor of the user by adjusting a rotational speed (RPM) according to the movement distance. Here, the rotational speed of the driving motor may be set by multiplying the stretched distance by a predetermined constant.

When the driving motor **200** operates, the speed of the display mounting device **10** for posture correction is linearly changed and as the speed rises to the maximum speed and then is lowered, an inflection point may be formed as illustrated in (b) of FIG. **17**, but is not necessarily limited thereto. Here, the inflection point is a maximum driving speed of the driving motor **200**.

Specifically, unlike the related art that when the length of the arm unit **300** is adjusted, a loud noise is generated during the high-speed operation, the display mounting device **10** for posture correction adjusts the rotational speed according to the movement distance of stretching the arm unit **300** and as the speed is gradually increased, the noise generated by the driving motor **20** is gradually increased and then the speed is gradually reduced with respect to the inflection point to minimize the distraction element of the user.

The display mounting device **10** for posture correction may set a maximum driving speed which causes a noise which does not distract the user and adjust the speed of the driving motor **200** according to the movement distance with respect thereto. Here, the display mounting device **10** for posture correction may further consider the movement time and sets a maximum movement time until the arm unit **300** moves to be fixed to maintain a target posture. Accordingly, the display mounting device **10** for posture correction linearly drives the driving motor **200** such that the movement distance of the arm unit **300** does not exceed the maximum driving speed within a predetermined movement time to maintain a target posture.

Specifically, when the arm unit **300** moves by a predetermined distance, the display mounting device **10** for posture correction operates the driving motor **200** to increase the speed by half the predetermined distance and when the speed reaches to the maximum driving speed, operates the driving motor to reduce the speed of the driving motor by half the predetermined distance to stop the operation.

Accordingly, the display mounting device **10** for posture correction increases the usage convenience by controlling the stretching speed to be gradually increased.

According to another exemplary embodiment of the present invention, the control unit **32** classifies the state of the user into a normal state or an abnormal state (for example, a bad posture stage) and varies an acceleration of the driving motor according to the state of the user.

For example, the posture of the user is normal and a button (not illustrated) manipulating signal of the user for adjusting a height of the display **20** is input, the control unit **32** sets to increase the speed of the driving motor according to a 1-1-th acceleration and decrease the speed the driving motor according to a 1-2-th acceleration. Here, the manipulating signal which is input by the user to adjust the height of the display **20** may be generated not only by a button, but also by adjusting a normal posture setting by the control unit **32**.

When it is determined that the posture of the user is an abnormal state, that is, the posture of the user is in a bad posture stage, the control unit **32** moves the display **20** to maintain the normal state. At this time, the control unit **32** is set to increase the speed of the driving motor **200** at an acceleration which is lower than the 1-1-th acceleration and decrease the speed of the driving motor **200** at an acceleration which is lower than the 1-2-th acceleration. Further, in the example of FIG. **17**, a gradient indicates an acceleration at which the display moves and a magnitude of the acceleration may vary according to the abnormal stage degree of the user. For example, when the user's abnormal state is mild (for example, it can be determined according to an error index), the acceleration in the increase section can be made relatively small and when the abnormal state is severe, the acceleration may be relatively increased by the increase section.

Even though it has been described above that all components of the exemplary embodiment of the present invention are combined as one component or operate to be combined, the present invention is not limited to the exemplary embodiment. In other words, one or more components may be selectively combined to be operated within a scope of the present invention.

The above description illustrates a technical spirit of the present invention as an example and various changes, modifications, and substitutions become apparent to those skilled in the art within a scope of an essential characteristic of the present invention. Therefore, as is evident from the foregoing description, the exemplary embodiments and accompanying drawings disclosed in the present invention do not limit the technical spirit of the present invention and the scope of the technical spirit is not limited by the exemplary embodiments and accompanying drawings. The protection scope of the present invention should be interpreted based on the following appended claims and it should be appreciated that all technical spirits included within a range equivalent thereto are included in the scope of the present invention.

What is claimed is:

1. A method of adjusting a monitor, the method comprising:

providing an information display system comprising a base placed on or connected to a desk, an arm connected to the base, the monitor fixed to the arm via a mount, at least one sensor, at least one controller, and a driving module comprising at least one motor and a driving mechanism operatively connected to the at least one motor;

detecting, using the at least one sensor, a plurality points on a person who is sitting at the desk in front of the monitor;

assessing, by the at least one controller, a posture of the person using the detected points on the person; and

subsequent to assessing the posture, controlling, by the at least one controller, the driving module to adjust a location and a tilting of the monitor in view of the assessed posture such that the more the monitor advances toward the person along a horizontal direction, the higher the monitor is raised and the more an information display surface of the monitor tilts downward relative to a horizontal surface of the desk, in which a level of the adjustment of the location of the monitor is determined based on a distance between the monitor and the person and a size of the information display surface, and further in which a level of the adjustment of the tilting is determined in view of the level of adjustment of the location of the monitor.

2. The method of claim **1**, wherein the at least one controller controls the driving module to adjust the tilting of the monitor in view of the location of the monitor that is being adjusted.

3. The method of claim **1**, further comprising placing the base on or connecting the base to a desk, wherein the at least one controller controls the driving module to adjust the location of the monitor in a vertical direction relative to a desk on which the information display system is placed.

4. The method of claim **1**, wherein assessing the posture comprises assessing a bending angle of the person's neck.

5. The method of claim **1**, wherein the at least one controller assesses the posture of the person based on at least one location of a face, a neck and a torso of the person.

6. The method of claim **5**, wherein the at least one controller assesses the posture of the person based on a distance to the face, a distance to the neck and a distance to the torso relative to a reference point.

7. The method of claim **5**, wherein the at least one controller assesses the posture of the person based on an angle between a first line connecting the face and the neck and a second line connecting the neck and the torso.

8. The method of claim **1**, wherein the at least one controller control the driving module to adjust the location of the monitor in a vertical direction and in the horizontal direction simultaneously.

9. The method of claim **1**, wherein the at least one controller controls the driving module such that the monitor moves in the horizontal direction and a vertical direction concurrently rather than consecutively.

10. The method of claim **1**, wherein the arm comprises a first arm portion and a second arm portion, wherein the first arm portion is generally vertical and integral to the base, wherein the second arm portion extends from the first arm portion and is slanted relative to the first arm portion.

11. The method of claim **1**, wherein the arm comprises a housing that houses the at least one motor and at least part of the driving mechanism.

12. The method of claim **1**, wherein the arm comprises at least part of the driving mechanism.

13. The method of claim **1**, wherein in a preset mode, the at least one controller controls the driving module for adjusting at least one of the location of the monitor along a predetermined trajectory.

14. The method of claim **1**, wherein in a preset mode, the at least one controller controls the driving module for moving the monitor back and forth relative to the person.

15. The method of claim **1**, wherein the driving mechanism comprises at least one gear operatively connected to the at least one motor.

16. The method of claim **1**, wherein the driving mechanism comprises at least one column configured to convert rotation of the at least one motor to a linear displacement.

17. The method of claim **1**, wherein the base comprises a clamp for clamping the desk.

18. The method of claim **1**, wherein the at least one sensor is disposed at the arm at a level below the monitor.

19. The method of claim **1**, wherein the at least one sensor is provided for placing on a surface of the arm.

20. The method of claim **1**, wherein the at least one sensor comprises a time-of-flight sensor.

21. The method of claim **1**, wherein assessing the posture comprises determining a face, a neck and a torso of the person using at least part of the detected points.

22. The method of claim **1**, wherein the arm comprises a slanted section extending between a lower end and an upper end thereof in a slanted direction, in which the upper end is higher than the lower end in a vertical direction and the upper end is closer to the person than the lower end in a horizontal direction.

23. The method of claim **22**, wherein the driving mechanism comprises a displacement mechanism configured to cause a liner motion of the upper end of the slanted section along the slanted direction:

such that the upper end of the slanted section is to move upward and downward along the vertical direction and further is to move toward and away from the person along the horizontal direction while the lower end of the slanted section does not move along either the vertical direction or the horizontal direction;

such that the slanted section changes a length thereof along the slanted direction;

such that the upper end of the slanted section moves toward the person along the horizontal direction as the upper end moves upward along the vertical direction;

such that the upper end of the slanted section moves away from the person along the horizontal direction as the upper end moves downward along the vertical direction; and

further such that the location of the monitor is adjusted both along the horizontal direction and the vertical direction concurrently as opposed to adjusting of the location of the monitor along the horizontal direction independently from adjusting of the location of the monitor along the vertical direction, wherein the driving mechanism further comprises a tilting mechanism configured to adjust the tilting of the monitor.

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